IRON & COAL
THE IRON AND COAL TRADES' REVIEW

Comet DOES IT AGAIN
WITH ANOTHER FIRST!!

NEW P.15 FASTENER
SPECIALLY DESIGNED TO UTILISE THE EXTRA STRENGTH IN PREMIUM GRADE BELTINGS

It took Comet know-how, our unrivalled technique, and the famous wedge action clench to produce a fastener whose strength matches up to the new high tensile beltings. Designed specifically for *premium* beltings, you can now use 15% more of their extra strength. Prove it for yourself — Comet P.15 Fastener makes the strongest joint ever!!

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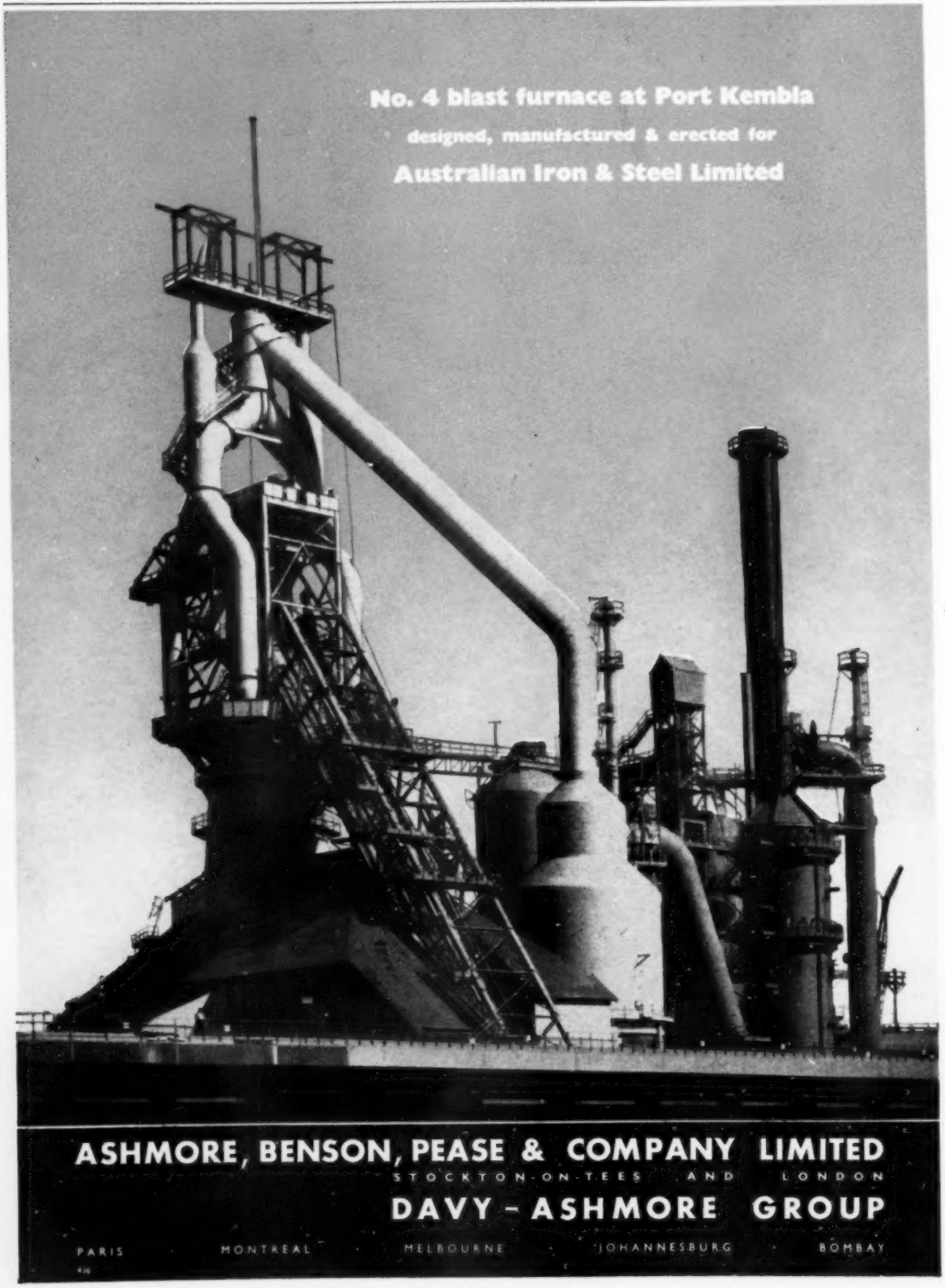

No. 4 blast furnace at Port Kembla
designed, manufactured & erected for
Australian Iron & Steel Limited
ASHMORE, BENSON, PEASE & COMPANY LIMITED
STOCKTON-ON-TEES AND LONDON
DAVY - ASHMORE GROUP
PARIS
MONTREAL
MELBOURNE
JOHANNESBURG
BOMBAY
436

ELECTRICALLY CONTROLLED Railway Sidings

by SUMMERSON'S

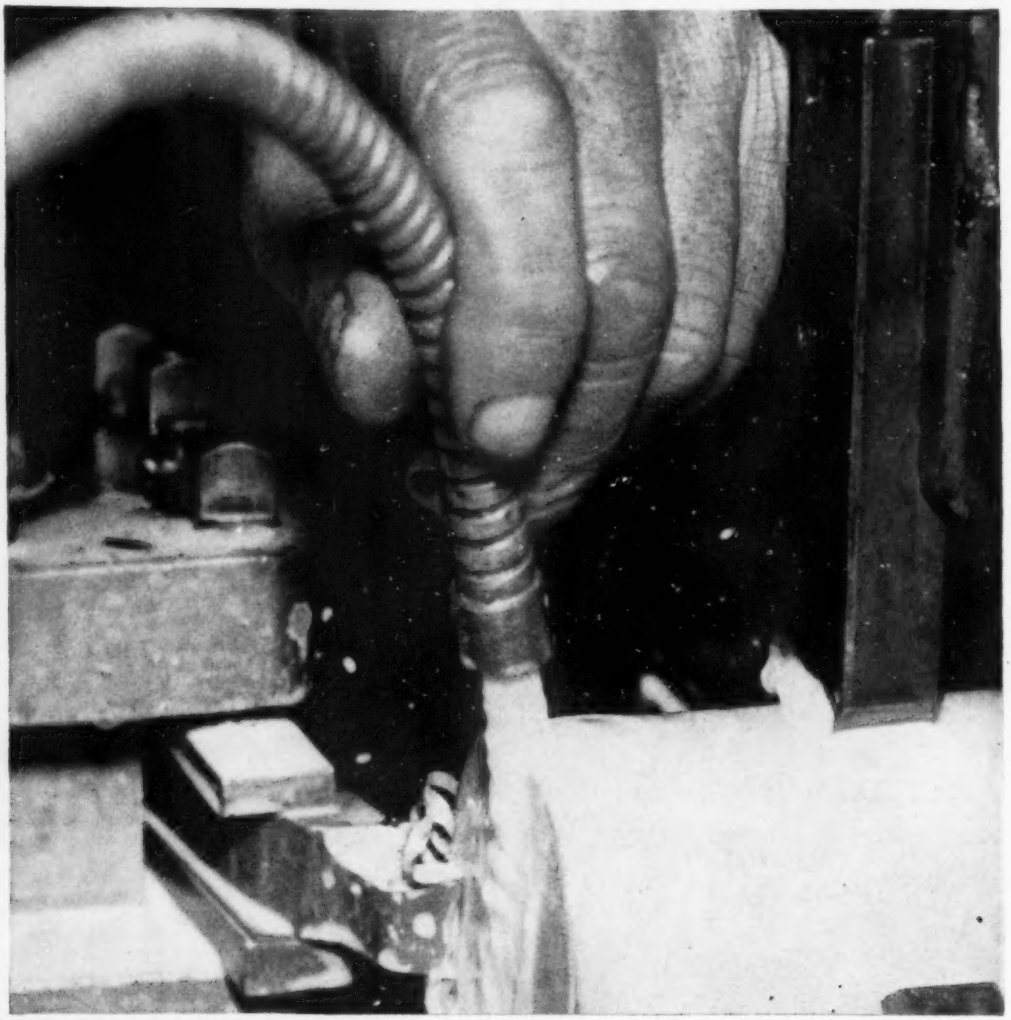
This sidings contract for the North West Gas Board, Mersey Group, had to be laid without disturbing existing gas production. As Consulting Engineers working with the Gas Board engineers, Summerson's surveyed and designed the layout and drew up a specification. As main contractors, Summerson's manufactured and installed the track which consisted of two different designs. One, involved 8,100 yards of track which included 41 turnouts, 12 tandem turnouts and 3 single cross overs, the other consisted of 765 yards of fully guarded track for fixing in concrete to top rail level, including a scissors cross over and turnouts. The main coke sidings have electro-pneumatically operated switches to direct wagons which move from the tippler tables by gravity, into the correct road. Just another example of how Summerson's experienced "know how" enables a difficult installation to be successfully carried out.

MAIN CONTRACTORS: Thomas Summerson & Sons, Ltd. CIVIL WORK: Leonard Fairclough Ltd. ELECTRO-PNEUMATIC EQUIPMENT: Westinghouse Brake & Signal Co. Ltd.

THOMAS SUMMERSON & SONS, LTD., MOWDEN HALL, DARLINGTON, CO. DURHAM. Telephone: DARLINGTON 5226

London Office: Sa Dean's Yard, S.W.1. Abbey 1365

Shell achievement

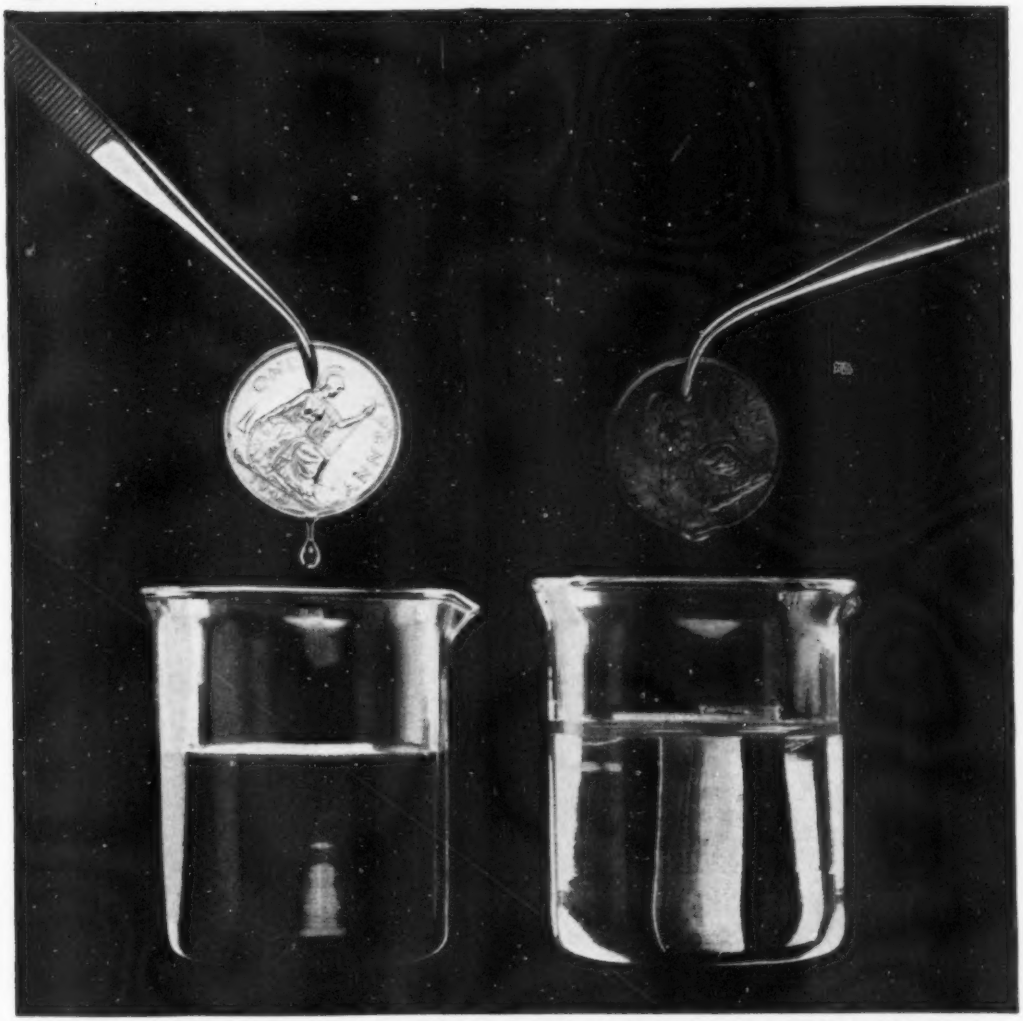


One of Shell's recent achievements in Industrial Lubrication has been to reduce the risk of skin trouble for machine operators. Until the new Shell Dromus range, most modern soluble cutting oils contained phenolic compounds, which can cause skin irritation. They were used as coupling agents between the actual oil and the emulsifier. On high-speed machines, especially, the water evaporates and the emulsion concentrates. And that's when the trouble can start. Shell scientists found a better coupling agent, and made it work. And now, at no extra cost, management can reduce working risks for their staff. *Write for the book, 'Selecting Your Cutting Oils', to Shell-Mex House, London.*

SHELL

SHELL INDUSTRIAL OILS

Shell demonstration

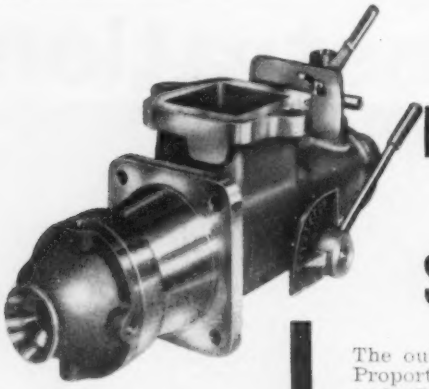


Two clean bright pennies are placed in beakers of oil, one in Shell Garia Oil 21, the other in a conventional cutting oil containing sulphurised additives. After three hours at room temperature one penny is still bright and stain-free, the other heavily stained with black copper sulphide. The bright penny is from the beaker containing Shell Garia Oil 21, the blackened one from that containing the conventional oil. While these were just pennies they could have been bronze bushes in your machine tools—stained in less than half a shift. Sulphur is essential in heavy duty cutting oils. Special additives in Shell Cutting Oils protect your machine tools and yet allow the sulphur to do its job. *Write for the book "Selecting Your Cutting Oils" to Lubricants Department, Shell-Mex House, London, W.C.2.*

DROMUS . . . PELLA . . . MACRON . . . GARIA

SHELL

SHELL CUTTING OILS



Here is one Oil Burner that brings efficiency SIMPLY to hand

The Burner shown has a maximum output of 12 gallons per hour and requires atomising air at 20" (51 cm) w.g. to 30" (76 cm) w.g. with oil at not less than 5 lbs per sq. in. (0.35 kgs per sq. cm) or equivalent head.

The outcome of 80 years' experience the Wallsend Self-Proportioning Low Air Pressure Oil Burner brings new ease and efficiency of control to oil burning. The single lever at the side automatically proportions oil and air quantities in the correct ratio and whatever the type of fuel.

It has, too, a turn down range of approximately 5 : 1 which can be achieved with a stable flame, efficient combustion and a high CO_2 content. Made with the well known Wallsend features of robustness, long service with little maintenance, and flexibility this outstanding burner leads the way, as well, to automatic or remote control of all single and multi-burner installations . . .

THE WALLSEND SELF-PROPORTIONING LOW AIR PRESSURE BURNER

For more efficient OIL BURNING consult

THE WALLSEND SLIPWAY & ENGINEERING COMPANY LIMITED

WALLSEND-ON-TYNE

In association with **HUBBARD COMBUSTION LIMITED** Kingston on Thames

N.C.B. FULL APPROVAL NO. 159

N.C.B. FULL APPROVAL No. 159

Designed to meet the most arduous operating conditions, this Silvertown PREMIUM belting of Cotton/Nylon/PVC construction has now been granted Full Approval No. 159 by the National Coal Board.

This Silvertown belting, as shown in service at a colliery in Northumberland, will ensure increased economies wherever it is installed.

Latest product of Silvertown research and development, Approval No. 159 belting gives...

** greater tensile strength * improved impact resistance * reduced weight * increased flexibility * better troughing * improved tear resistance * better fastener anchorage * permits smaller drums.*

Silvertown

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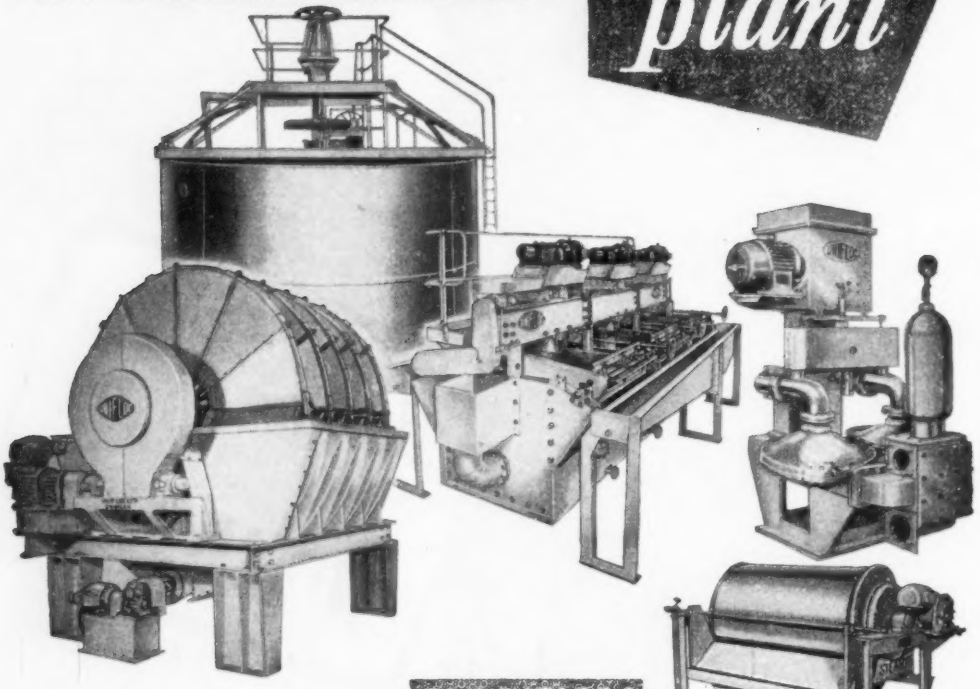
CONFER WITH UNIFLOC ON PROBLEMS OF

WET MATERIAL HANDLING *plant*



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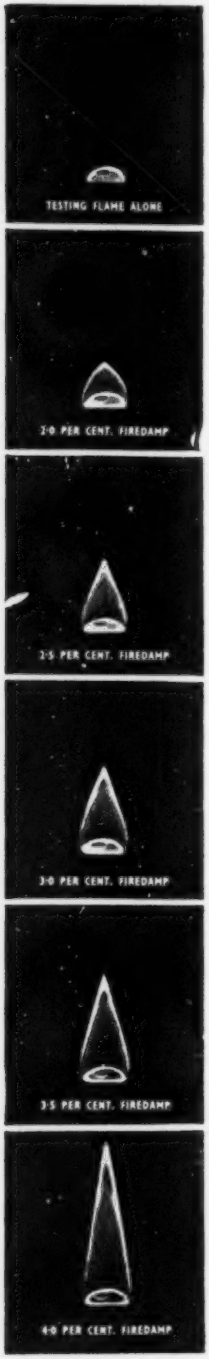

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Easy and rapid withdrawal

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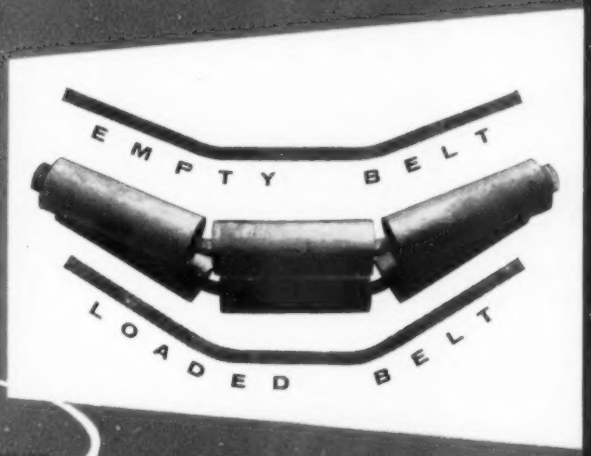

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PERHAPS YOUR GATE CONVEYOR IS OVERLOADED—
THEN CHANGE TO—

SUSPENDED IDLER STRUCTURE

May we send you particulars or arrange a demonstration?

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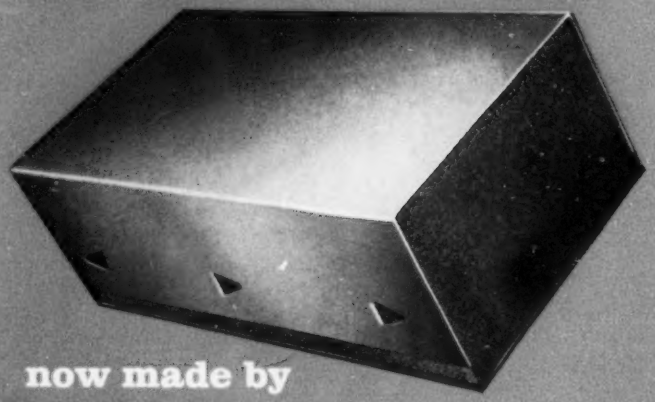
METAL CASED BASIC BRICKS



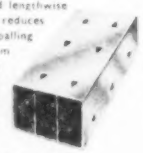
now made by

Pickford Holland

Under sub-licence from General Refractories Ltd., covered by British Patent No. 546,220 for the basic process of metal-cased brick manufacture and other British Patent No.'s 600,630—749,491—778,047 and 778,048.

METALCLAD "EE" BRICKS

Divided internally by two plates placed lengthwise. This system reduces flaking and spalling to a minimum and can be applied to all Metalclad shapes and sizes.



Covered by British Patent No.'s 546,220, 778,047 and 778,048

TABHANGER SUSPENSION

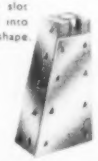
Bricks supplied with a special stainless steel tab co-moulded with the brick embedded into the surface of the top face. By the use of a special tool the tab may be bent out at right angles to the top face to form a hanger.

Covered by British Patent No.'s 546,220 and 749,491

FERROCLIP SUSPENSION

This method allows the brick to be suspended from the end. The Ferroclip hanger slot may be moulded into any roof or wall shape.

Covered by British Patent No.'s 546,220 and 600,630

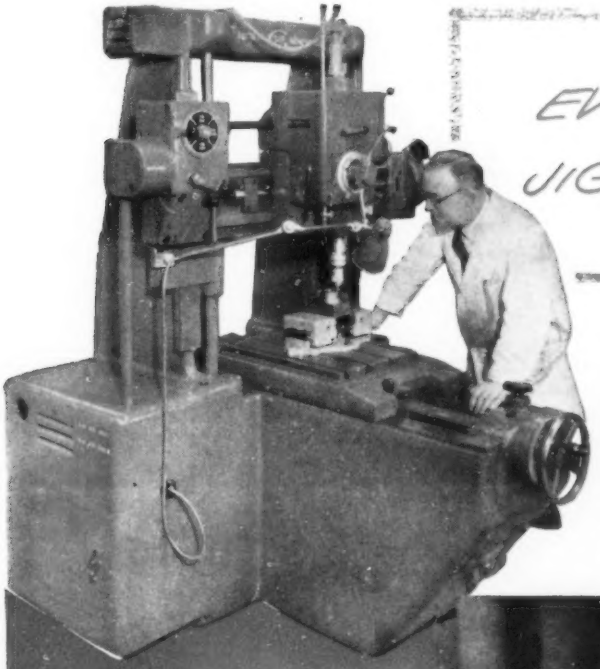


P. H. Metalclad bricks are cased in steel on four sides, graded refractory material and metal casing forming an integral unit. That's because of the controlled hydraulic pressure method of manufacture, which allows no air infiltration whatsoever. P.H. Metalclad bricks are easy to install because they're completely consistent in shape and size, and need no jointing cement. Spalling during temperature changes is eliminated, iron-oxide bursting is reduced to a minimum—in other words, they last longer too !

Make your needs known to Pickford Holland now!

P.H. METALCLAD Metal cased basic bricks

PICKFORD, HOLLAND & CO. LTD · SHEFFIELD · TELEPHONE: 33921

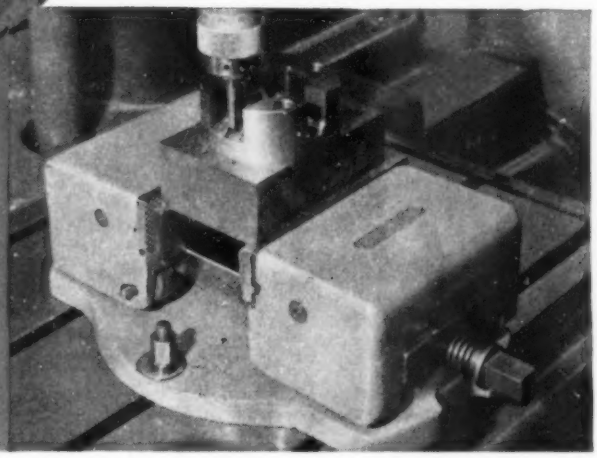


EVEN ON A JIG BORER...

Here is a Machine Vice with built-in precision. As its name implies, it actually grips the work hard down onto its table or parallels. An accurate set-up in seconds!

The illustrations show the boring of a location pin hole in a fuel pump assembly fixture at the premises of Messrs. AC-Delco, Liverpool, by whose courtesy the photographs are reproduced.

THE DORMER DOWN GRIP MACHINE VICE



* BUILT AS A MACHINE TOOL — FOR EFFORTLESS PRECISION

THE SHEFFIELD TWIST DRILL AND STEEL COMPANY LIMITED
SHEFFIELD ENGLAND
DORMER TOOLS ARE OBTAINABLE FROM YOUR USUAL ENGINEERS' MERCHANTS

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...opts for....

HUWOOD *Slung Structure*

Much of the present-day demand for conveyor structure which can be suspended from the roof has been created by the availability of Huwood Slung Structure—the first choice of a growing number of those mining engineers whose judgment in such matters is sharpened by day-to-day experience.

In common with many other Huwood elevated structures for use in gate and trunk roads, Huwood slung structure is based on the F.T. section which is fitted throughout with Huwood self-lubricating oil-filled rollers and is one of the most robust and serviceable conveyor sections used in present-day mining.

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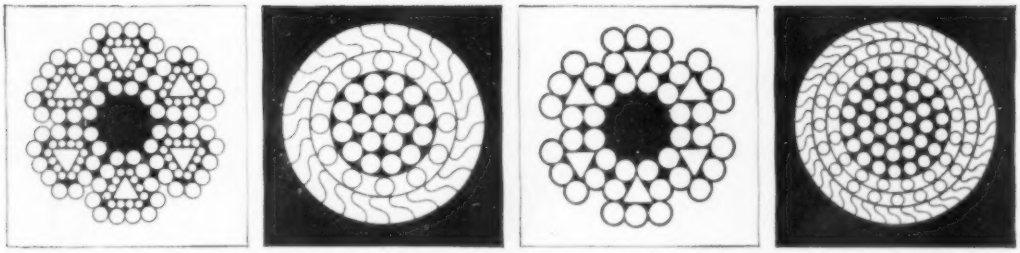
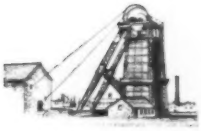
"Glover's Best"



STEEL WIRE ROPES for all purposes



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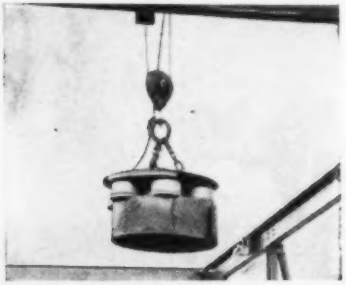
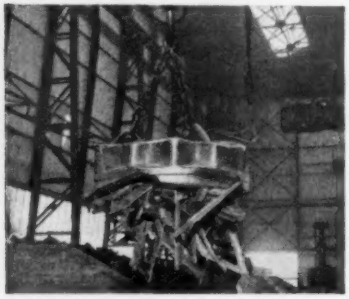
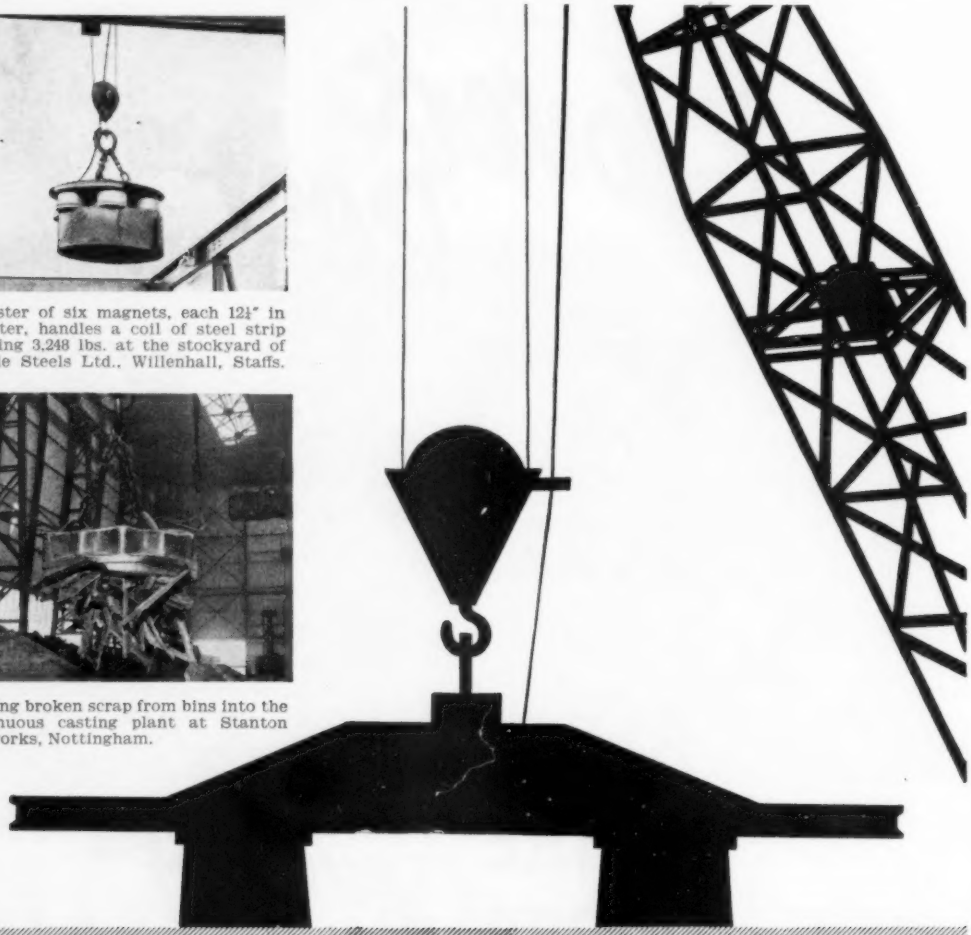


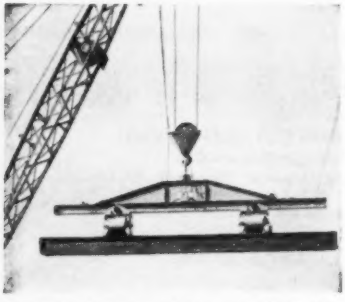
A cluster of six magnets, each 12¼" in diameter, handles a coil of steel strip weighing 3,248 lbs. at the stockyard of Ductile Steels Ltd., Willenhall, Staffs.



Loading broken scrap from bins into the continuous casting plant at Stanton Ironworks, Nottingham.



WITTON-KRAMER LIFTING MAGNETS FOR EVERY JOB



Two bi-polar magnets on spreader beam lifting rolled steel joist.

Whether handling hot steel billets and ingots or salvaging metal from under water, Witton-Kramer electric magnets do the job superbly. Circular, rectangular or bi-polar, G.E.C. makes them all with coils designed and constructed to withstand heavy duty and shock loads. All Witton-Kramer magnets are easily maintained and quickly serviced.

RELY ON THE EXPERIENCE OF G.E.C.

THE GENERAL ELECTRIC COMPANY LIMITED OF ENGLAND · WITTON-KRAMER DIVISION · BIRMINGHAM 6

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EASIER DRAWING AND PRESSING...

Photograph by courtesy of Lec Refrigeration Ltd

Another reason why industry is changing over to

DRAGONITE

ELECTRO-ZINC COATED SHEET STEEL

DRAGONITE is sheet steel which has been given a coating of pure zinc on both faces. It has a number of advantages over ordinary, uncoated sheet steel. During drawing and pressing operations, for instance, the surface properties of Dragonite are maintained. In fact, the fine-grained structure and natural ductility of pure zinc actually *assists* fabrication by acting as a dry, solid lubricant.

This ductility of Dragonite cuts manufacturing costs because it makes longer press runs possible and lengthens tool life.

There are many more good reasons why you should be using Dragonite. For fuller details, please write for a copy of the *Dragonite Technical Handbook* to:

These are some of the industries in which Dragonite is being used extensively: Office Equipment; Elevators; Agricultural Equipment; Automobile Industry; Domestic Appliances, Radio Equipment, etc.

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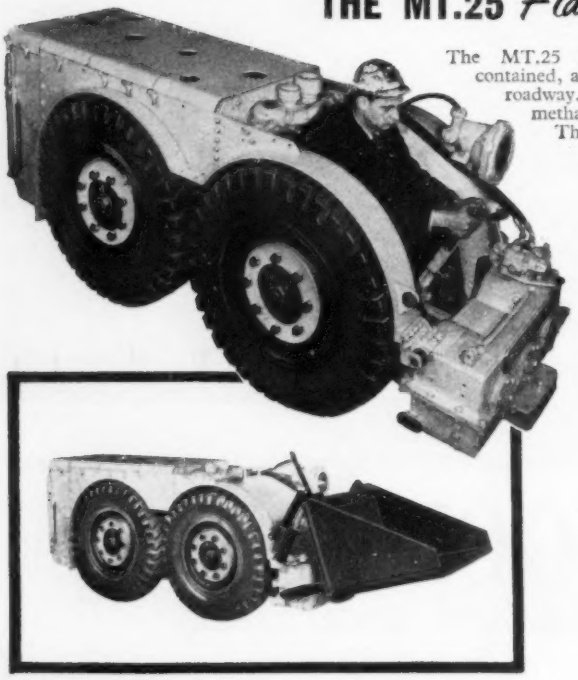
Hunslet TRACTORS

The ST. 125 Surface Tractor

THE MT.25 *Flameproof* MINES TRACTOR

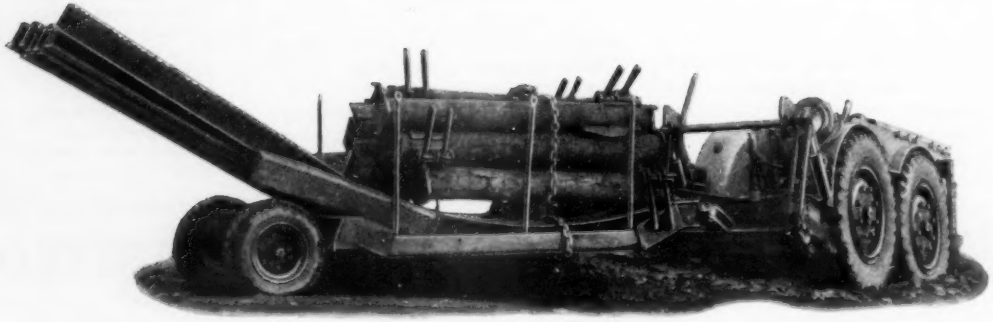


The MT.25 Flameproof Mines Tractor is robust, self-contained, and does not require rails or a specially prepared roadway. It can operate in areas where high coal dust and methane contents in the atmosphere may be encountered. The basic unit is equipped with a hydraulic pump and the frame is drilled for the attachment of ancillary equipment, for example:— Angle Dozer, Shovel Loader, Fork Lift, Winch, Trailers, etc.

BRIEF SPECIFICATION

ENGINE:	3-cylinder watercooled flameproof diesel developing 25 h.p. nett at 1650 r.p.m.
TRANSMISSION:	By torque converter to epicyclic forward and reverse gearbox.
STEERING:	Slew-type giving a turning radius of 5′ 6″.
BRAKES:	Hand operated on all four wheels.
TYRES:	Large diameter heavy duty with total load capacity of 12 tons.
DIMENSIONS:	Width 3′ 0″, Length 8′ 11½″, Height 3′ 5″.

THE HUNSLET ENGINE CO. LTD.
LEEDS 10
LONDON OFFICE: LOCOMOTIVE HOUSE, BUCKINGHAM GATE, S.W.1.



H.85

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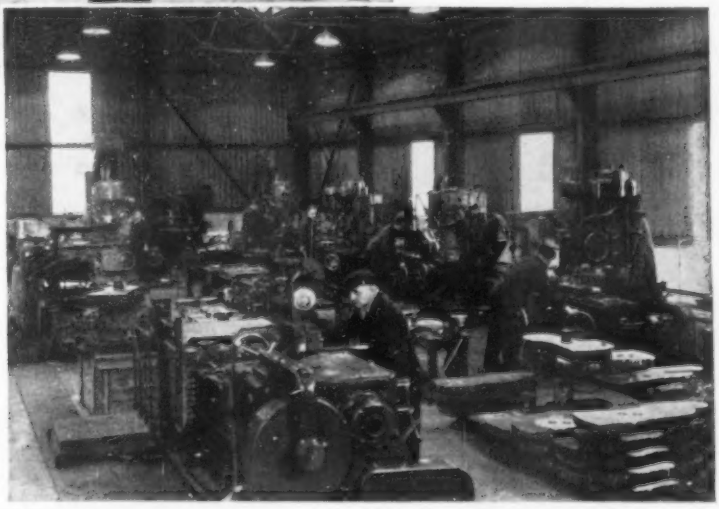
FOR HEAT TREATMENT AND TESTING

OF CAGE SUSPENSION GEAR, CHAINS, ETC.

General View of Heat Treatment and Testing shop—

General View of Machine shop—



EDWARD ORMEROD & CO. LTD.

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Dutch Print, Circa 1695, depicting the craft of the Wheelwright. (Copyright, Radio Times—Hulton Picture Library)

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and our trade is STEEL!

Not only mild steel for everyday use but also the special steels demanded by the Nuclear Age. . . for example we produced the special steel plates for the reactor vessels at Calder Hall, Chapelcross and Bradwell, and we have now supplied plates for the nuclear power station reactor at Latina, Italy.

YOU SHOULD HAVE THIS BOOK.

An interesting booklet "Steels for the Job", just published by us, describes some of our newer products. We shall be delighted to send you a copy. Our Technical and Research Department will also welcome enquiries from any whose problem is . . . **STEEL**

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New

'GR' PROVED

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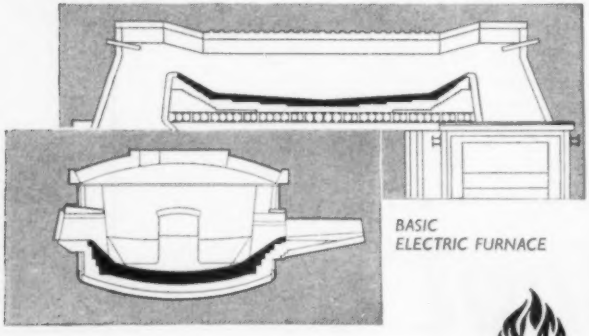
for Open Hearth & Electric Furnace Bottoms

RAMAG has been proved in open hearths, electric furnaces for the working monolith, taphole construction, launders, fettling, patching, etc. Wholly Dead Burnt Magnesia, graded to give a dense, hard, slag and abrasion resistant hearth. RAMAG is designed to be rammed up wet, and installation, drying-out and burning-in can be carried out with no risk of hydration. Application instructions on request.

BASIC O.H. FURNACE



BASIC ELECTRIC FURNACE

What is RAMAG?

The GENEFAX Group for Everything in Refractories

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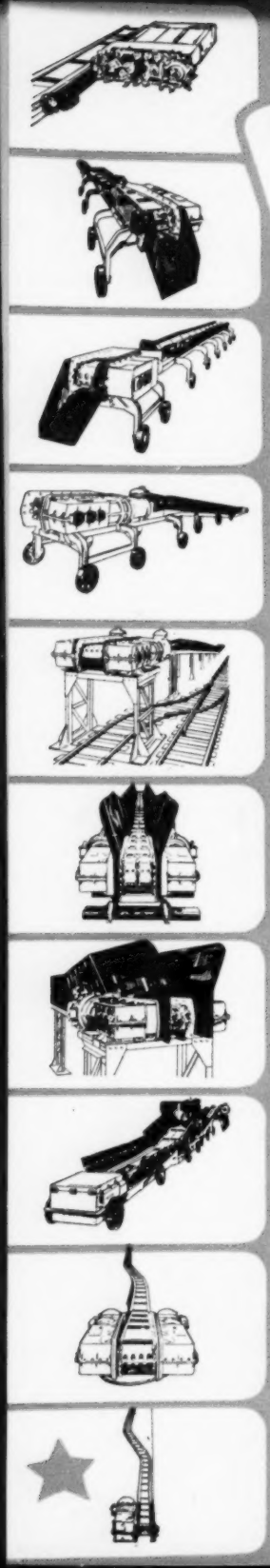

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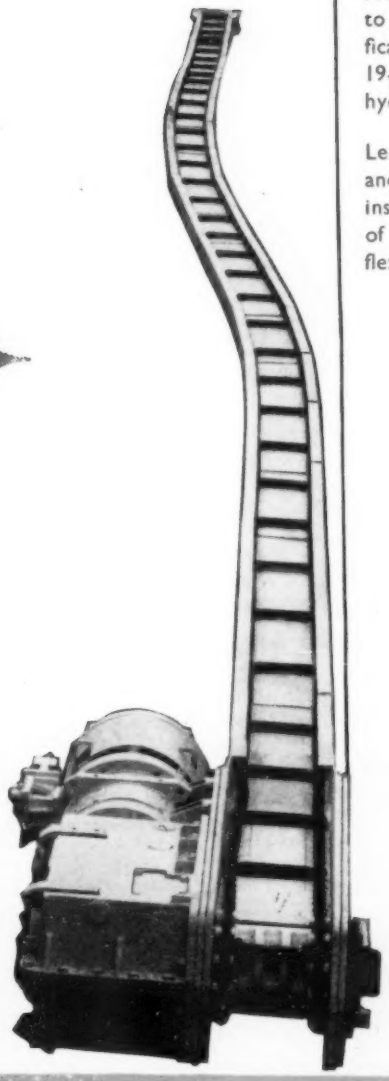

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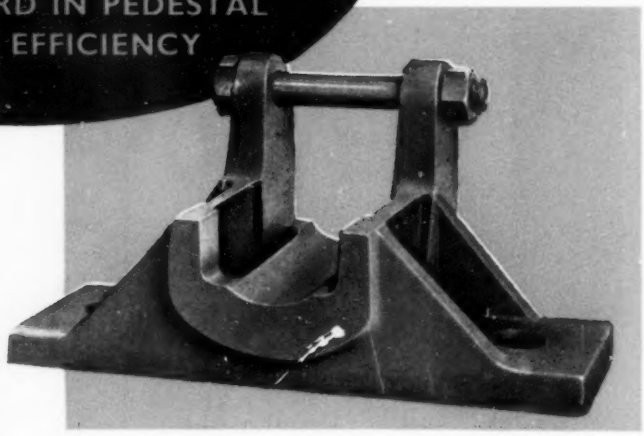

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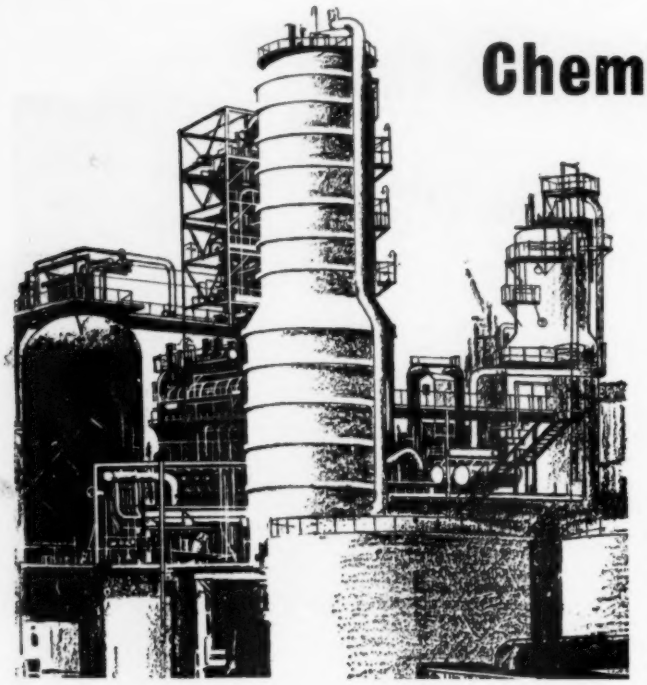

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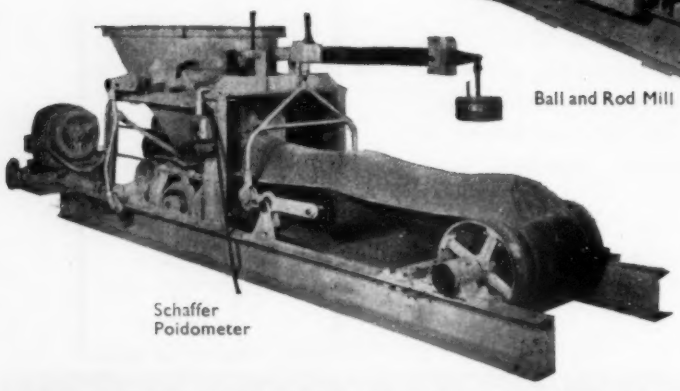

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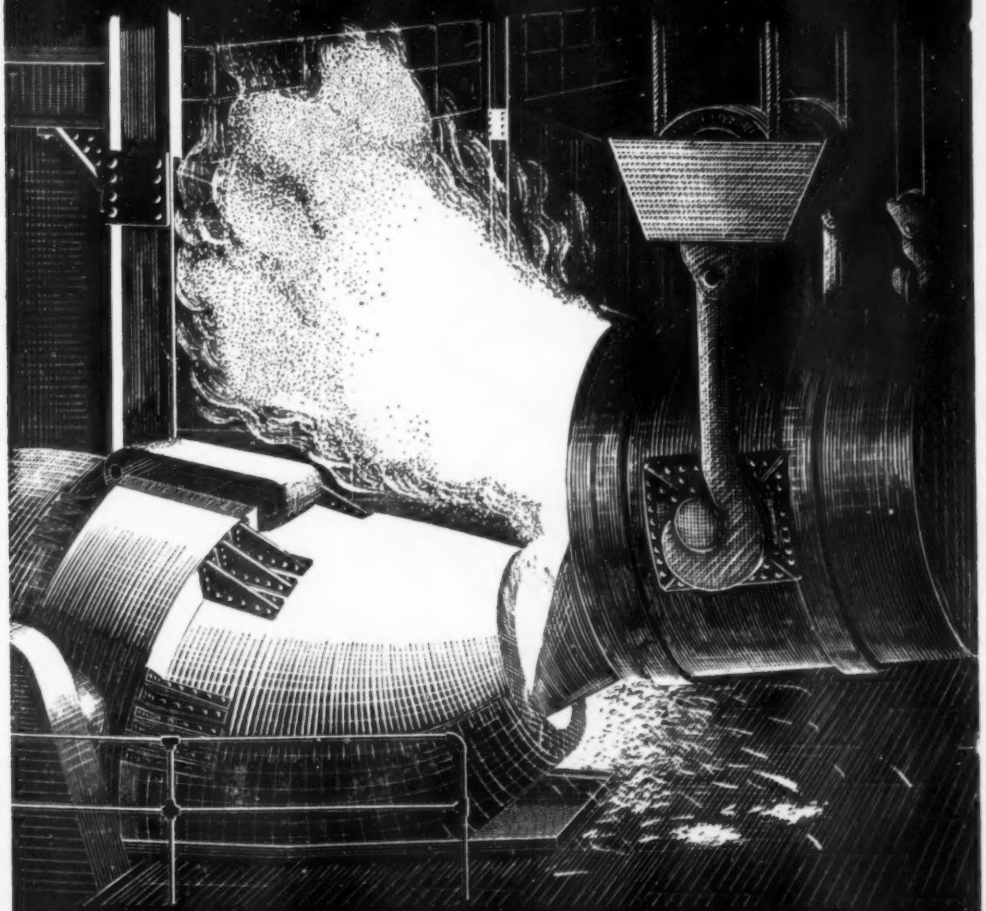

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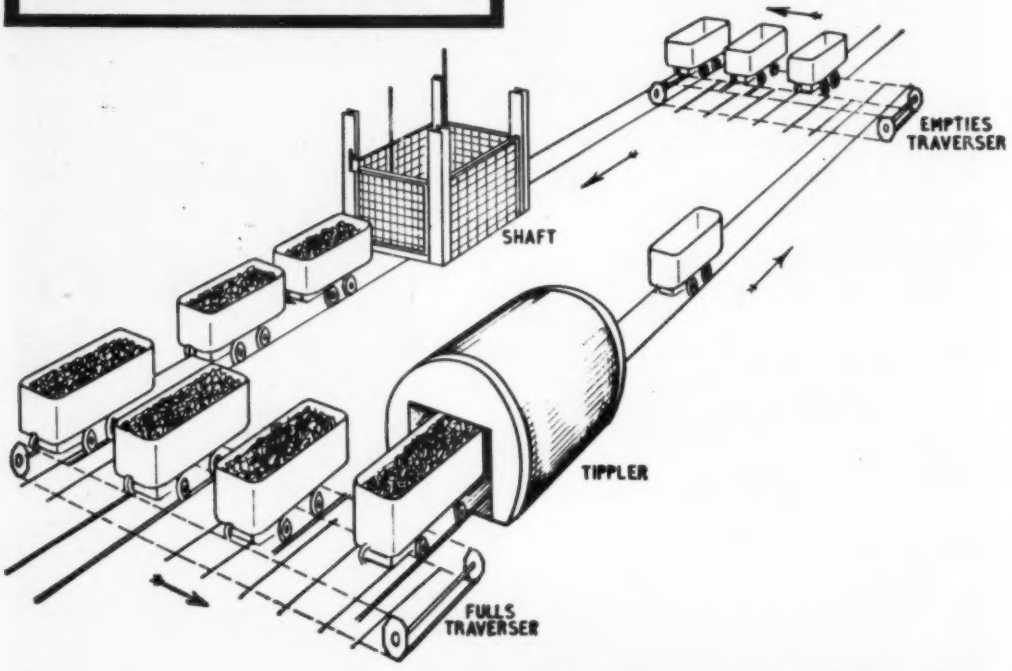

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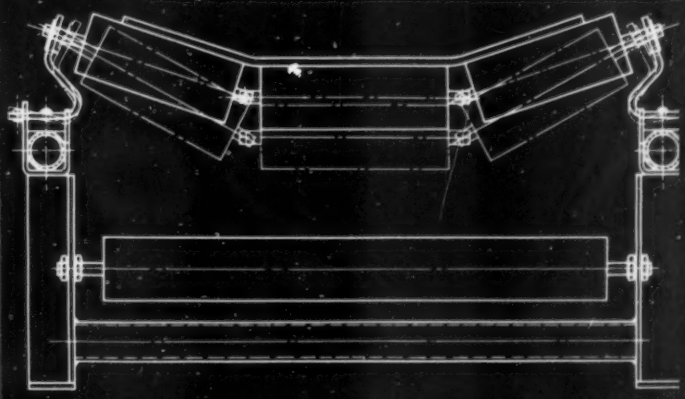

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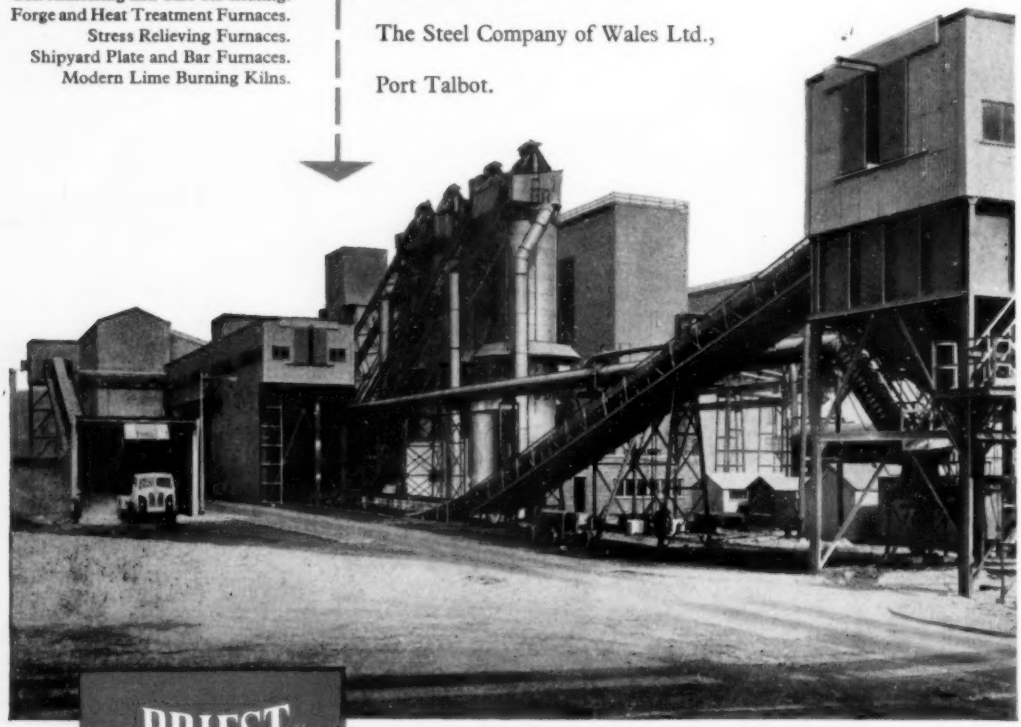

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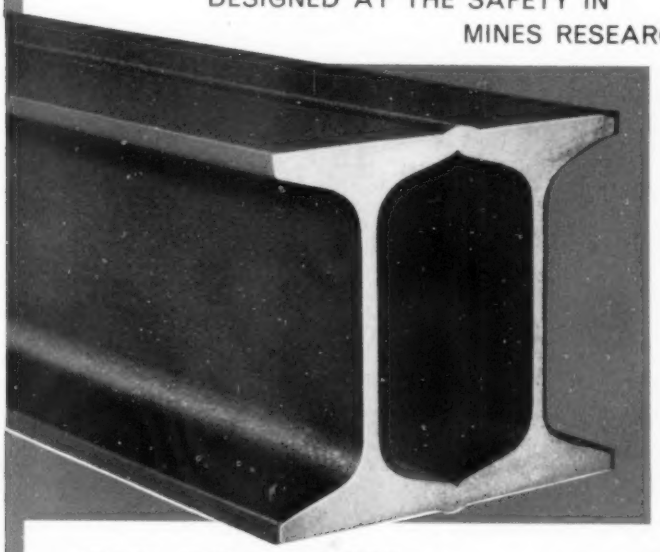

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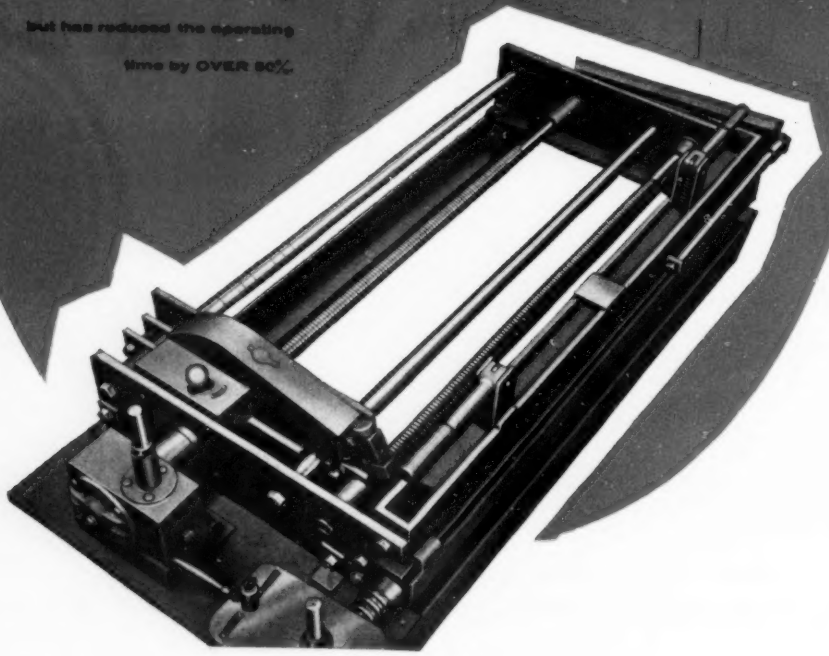

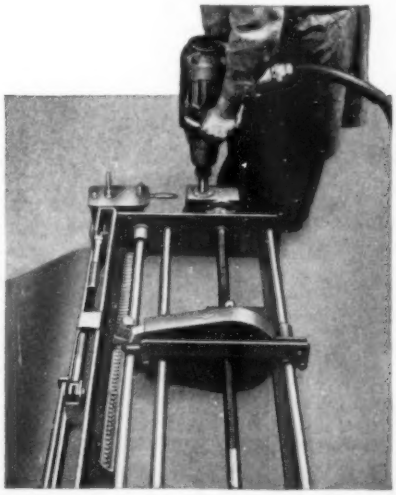

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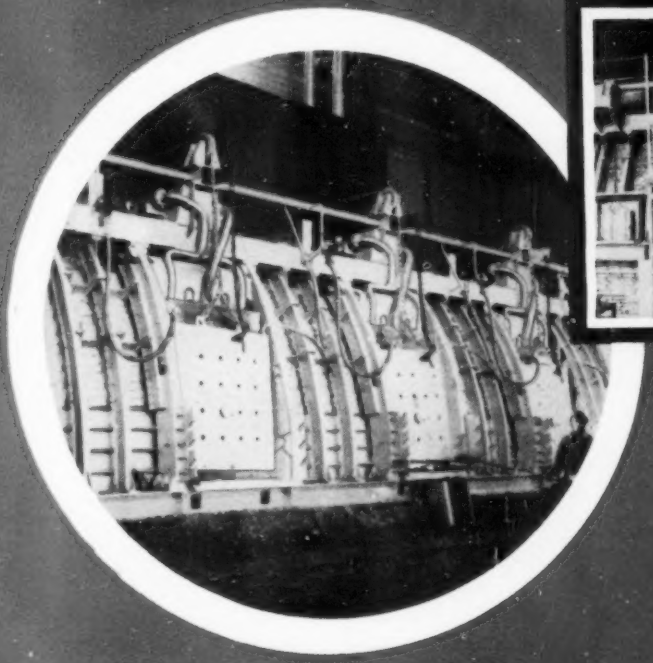

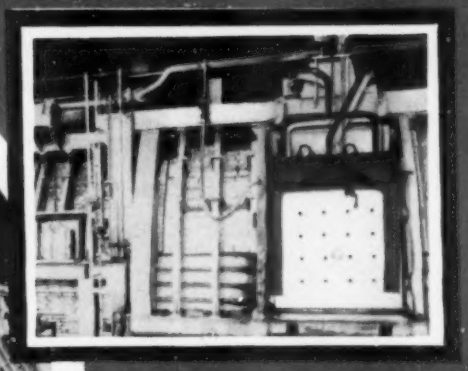

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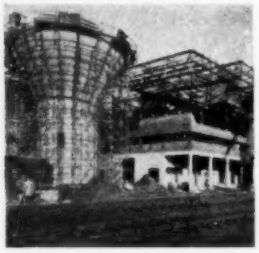
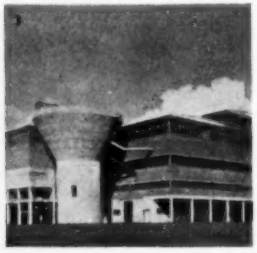
Stages in the building of the new 500 t.p.h. Baum plant at Killoch in the Scottish Division of the National Coal Board. Simon-Carves have also supplied the skip, cage and mine car handling plants for this new colliery. The two 18-ton skips are among the largest ever made.





RECONSTRUCTED

Stages in the reconstruction of Polkemmet washery. The original plant is seen as it was in 1926. In 1955 an extension was built and new machinery was installed in the old and the new buildings. In 1958 the exterior of the old section was replaced so that it matched the extension.

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Vol. 182
No. 4837

IRON & COAL

THE IRON AND COAL TRADES' REVIEW

MARCH 31
1961

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with a Markham Primary Breaker

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with a Crusher Stower

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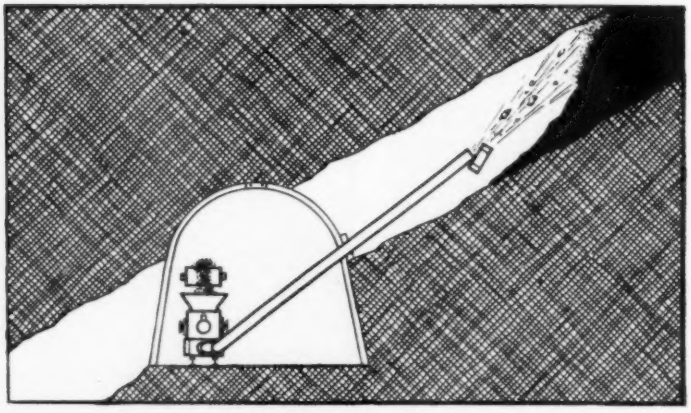

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Vol. 182 March 31, 1961 No. 4,837

Confusion Worse Confounded?

IN a recent broadcast programme a woman who is now living in a smoke control area said that she was bewildered by the variety of available fuels. This is one of many clear indications that the multiplicity of names and descriptions of solid fuels is proving a handicap where competition with other fuels is concerned. The lady's complaint is quite understandable. If she has a gas, or electric, or oil fired appliance installed, there is no problem. The gas from the pipes or the electricity from the wires will be satisfactory whatever appliance she may select; she has no need to exercise a choice of fuel. Within very narrow limits the same applies in the case of oil, but in the case of solid fuel the position is very different.

Coal is a natural product and its characteristics vary not merely from pit to pit, but even from seam to seam. The position is further complicated by the production of coke and other carbonized and processed fuels, all of which have their own characteristics and their own names, and the consumer is faced with the problem of distinguishing and choosing between them. As if the problem were not already sufficiently complicated, it is becoming more and more customary for merchants to adopt their own names for the fuels they sell. Naturally, it is a very attractive proposition for a merchant to popularize, for example, a particular coke under some such name as "Clairco," knowing that anyone wanting it must come to his firm for it. But is it good for the future of the trade as a whole?

Is it wise to assume that no consumer could be at a loss in differentiating between, say, Warmco and Gloco or Coalite and Sebrite? It is quite conceivable that distributors exist who are not completely knowledgeable themselves! If a householder who had lived in North-west England moved to the suburbs of London and said that she had always burned Phimax, it might require quite a lot of inquiry before she was offered a similar and suitable fuel. No such difficulty would arise, however, with a gas, electric, or oil appliance.

The addition of the new National Coal Board smokeless fuel to the ever-growing list, when it becomes available, will make the problem more acute for the perplexed public. It is of paramount importance to the coal trade that consumers should have the task of selecting their fuel made as simple as possible. It should not be beyond the wit of man to find some method of describing fuels so that a consumer can know which will suit his particular appliance. It seemed likely that there would be a national name for cokes of the nature of Cleanglow and another for cokes of the nature of Gloco, but so far it does not appear to have been universally adopted. This would be a step in the right direction, but it does not go nearly far enough. Very many consumers are being forced to use unfamiliar fuels as a result of the establishment of smoke control areas. Strong pressure is brought to bear on them to take the opportunity of changing over to gas or electricity. If they are to be persuaded to remain on solid fuel, every effort must be made to see that it is as simple for them as possible.

It is not only in the choice of fuels that consumers find themselves in difficulty, but in the choice of appliances as well. With a multitude of appliances from which to choose and with a wide range of coals to be considered, there is a real danger of householders preferring simplicity even at higher cost. The Coal Utilisation Council, jointly with the Solid Smokeless Fuels Federation, issues a most valuable list of appliances and the fuels suitable for them, but it is not the type of publication suitable for the public to use as a guide. The voluminous detailed information contained in the list is in itself a measure of the extent of the problem. What seems to be required is something much more simple—possibly a grouping of fuels in categories according to their use, somewhat on the lines of the categories set out in the Peech report on solid smokeless fuels. At the same time, it would prove a great advantage if the number of different names for similar fuels could be drastically reduced.

The new NCB smokeless fuel holds out great promise and could prove of outstanding importance in retaining the domestic heating load for solid fuel. It would be most unfortunate if its name, when it has been christened, merely becomes submerged under the rising flood of other names. There should be scope here for joint action by the NCB, the coal trade, the Solid Smokeless Fuels Federation, and the Coal Utilisation Council.

ONE OF THE WORLD'S largest walking draglines is being erected by Newton, Chambers & Company, Limited, at the Roxby open-cast ironstone mine, near Scunthorpe, which is worked by the ore mining branch of the United Steel Companies, Limited. The machine, a Rapier W.1800 made by Ransomes & Rapier, Limited, will weigh about 1,850 tons, and with its 303-ft. boom and 25 cu. yd. bucket will be capable of stripping up to 30 tons of overburden at each "bite."

Passing Thoughts . . .

MR. RICHARD WOOD

WE are convinced that the country wants denationalization. We do not consider that the results, broadly, of nationalization are so impressive as to sustain any coherent argument in favour of such an organizattion for . . . the steel industry.

We believe that an industry of this range and importance must be subject to some supervision, but that public supervision can well be secured without State ownership. — MR. RICHARD WOOD, Minister of Power, replying in a debate in the House on the disposal of holdings in the iron and steel industry.

> *I do not think that the steel industry would be wise to have an inquiry covering the past 10 years, making known the prices it has had to pay for coal compared with the prices paid by its continental competitors . . . if they carried out such an inquiry it would be discovered that the coal industry—comparing prices here with those in Europe—has been subsidizing the steel industry.*—MR. MICHAEL FOOT, *MP for Ebbw Vale, during the same debate.*

Probably the greatest opportunity yet faces the British steel industry, the opportunity to have steel of the highest quality at lower capital cost and lower running costs than ever before. It is very important that the people of this country should be encouraged to invest in the industry, knowing that they will not have a quick return but knowing . . . that they are investing their own savings in the growth of a great British industry.—MR. DAVID WEBSTER, another speaker in the debate.

> *Something of a love-hate relationship exists between users and makers of instruments; they are forced by common interests to work closely together, but they lose no opportunity to complain about the others failings.—The Economist.*

Since no appeal seems likely to achieve very much, why not face the fact that if we must export to survive as a world power, the only solution is to fine (by taxation) the profits of all businesses who do not export? . . . Even if the rate of "fine" were small, psychologically it might persuade some of the laggards to gird up their loins and commence exporting.—MR. J. V. KLEIN, joint managing director of the Compoflex Company, Limited, group, in a letter to the Financial Times.

> *Not nearly enough importance is attached to the idea of hard work, and there is no medical support for the proposition that hard work gives a man thrombosis or ulcers.*—MR. HUGH P. BARKER, *chairman of the British Institute of Management.*

There is much to be said for the establishment of State-owned competitive factories, designed to supplement industrial production and to act as a spur to efficiency in existing firms. . . . Rather than a sweeping programme of expropriation and nationalization for the [machine-tool] industry there is a strong case for State-owned machine tool plants, specializing particularly in the types of machine tools where the existing industry is deficient.—MR. HAROLD WILSON, MP, writing in the New Statesman and Nation.

> *The time has come for a major step forward in industrial relations. If our economy is to expand more rapidly greater confidence between both sides has to be developed. We must make easier the introduction of new techniques and methods essential to higher productivity and a higher standard of living.*—MR. JOHN HARE, *Minister of Labour.*

ISHRA STEEL COMPANIES' 1960 RESULTS

DETAILS of accounts for the year ended October 1, 1960, for the companies within the Iron and Steel Holding and Realization Agency, are as follows:—Bairds & Scottish Steel, Limited, manufacturing and trading profit £848,305 (£292,709), net profit £143,298 (£84,922). Ordinary dividend 10 (4) per cent. John Baker & Bessemer, Limited, group manufacturing and trading profit £220,466 (53 weeks £220,915), net balance £69,177 (£91,307). Ordinary dividend 15 (20) per cent.

Barrow Ironworks, Limited, manufacturing and trading profit £326,930 (53 weeks £312,844), net balance £36,066 (£70,995). Dividend 3 (5) per cent. Barrow Steel Works, Limited, manufacturing and trading profit £62,898 (loss £88,998 for 53 weeks), balance £39,792 (loss £235,362). Gjers, Mills & Company, Limited, manufacturing and trading profit £135,918 (£106,660), net profit £64,847 (£45,782) plus £3,271 (£4,466) tax written back. Dividend 8 (same) per cent.

ISHRA has published the accounts of its companies in volume form for the year ended October 1, 1960. Copies are obtainable on application to the agency at 1, Chester Street, London, S.W.1, price 7s. 6d. (post paid).

Sheffield Steel Firm's New Plant at Barnsley

BECAUSE lack of land in Sheffield prevented its expansion, C. G. Carlisle & Company, Limited, stainless steel manufacturers, has built a new plant at Barnsley (Yorks), and, less than seven months after the first turf was cut, it went into production on Monday.

The firm is transferring to Barnsley the finishing, inspection, and despatch of the 80-100 tons of steel a month it supplies to Sheffield's cutlery trade. The cogging mill is also being installed there and will be in operation shortly.

Mr. Geoffrey William Mann, head of the firm, has said that all the developments have so far been paid for out of the company's resources. The 16-acre Barnsley site—with less than an acre so far built on—allows plenty of room for more expansion.

Initially about 20 men will be employed at the new plant, but these numbers should double and treble as shifts increase and more building takes place. As a result of the firm's expansion, its output is expected to increase by a third.

A SOLID FUELS EXHIBITION is to be opened by the National Coal Board at Grimethorpe (Yorks) on Wednesday. It will continue until April 11. The exhibition will be held in premises adjoining No. 4 (Carlton) Area headquarters, North-Eastern Divisional Coal Board.

"Push Button" Steel

COMPLETE AUTOMATION IN NEAR FUTURE

COMPLETELY automatic cold rolling mill in a few years was foreshadowed when the new £2,000,000 cold rolling mill at the Brinsworth rolling mills of Steel, Peech & Tozer, branch of the United Steel Companies, Limited, was shown to the Press on Thursday of last week. "Steelworks used to look for men with strong backs and weak minds for the heavy work in rolling mills," said the manager, Mr. D. Reilly. "Now it is a matter of pressing buttons and letting electronically controlled machinery do the rest. I am quite sure my seven-year-old daughter could learn the job easily."

"At present 60 per cent. of the electrical installation represents new ideas, but when these have become established I can see no reason why the mills should not be purely automatic in production, with men being employed only in maintaining the machinery," Mr. Reilly believed.

Where suitable, the company employs "green" labour so that the men, without the prejudices that might be held by workers from traditional mills, can more easily be trained. Workers who would otherwise have been displaced by a £10,000,000 furnace modernization scheme are being absorbed by the new mills.

Precision and Consistency

The mill has been installed adjacent to the company's continuous medium hot strip mill which supplies its raw material. It was demonstrated that the precision and consistency in this installation renders the cold rolled product eminently suitable for use on automatic presses or where progressive tooling is employed.

After pickling, the coil strip passes to the four-stand, four-high tandem mill, Nos. 1 and 4 stands of which are equipped with automatic gauge control and Nos. 3 and 4 having automatic inter-stand tension control. During the rolling operation the strip is not in contact with guides of any description and maintains its central position in the mill by means of the inter-stand tension which is infinitely variable. Any deviation in straightness of strip is indicated on the panels attached to each stand, enabling the roller to make the necessary adjustments to ensure production of strip within very close limits of straightness.

The feeding and stripping of the mill has been entirely mechanized and the largest raw material size of 18 in. by 0.250 in. is fed to the mill with no greater effort than that required for the minimum size in the range (4 in. wide by 0.048 in.).

The electrical plant associated with this mill embodies many of the latest developments and techniques in rolling mill control. The mill motors, having a combined rating of some 4,300 h.p., are supplied from rectifier/invertor units which serve the dual function of powering the mill motors during rolling and returning power to the supply during deceleration of the mill. This type of mill drive is believed to be unique in this country.

Rolls for the mills are ground on a roll grinder in all finishes up to a mirror finish. After roll grinding, varying degrees of matt finishes can be applied by additional treatment in shot-blasting equipment.

After rolling on the tandem mill, the strip is delivered to the annealing department which comprises two 290 ft. long Nasshueur continuous annealing furnaces, each with a capacity of 5 tons per hour. The coils are fed to a tilting table which positions the coil on a tray, which is then transferred to either of the two furnaces. From the charging of the strip to its exit after annealing, the process is completely automatic. The furnace section of the plant is heated by coke-oven gas, and nitrogen is used as a protective atmosphere throughout the heating and cooling zone to eliminate scaling or discoloration of strip surface.

After annealing, the coils are transferred to the two-high temper mill. The feeding and discharging equipment is a duplication of that used on the tandem mill, and the strip is given a varying percentage of reduction to produce strip in the intermediate temper range from skin passed to three-quarters hard. Coincident with the improvement to the physical properties of the strip resulting from the temper rolling process, the strip surface can be varied from matt finish to mirror finish according to the surface finish of the rolls.

Each coil is tested after every operation with the requisite testing equipment, dependent upon the physical properties and surface requirement desired in the end product, and for each specification a complete history is kept of the steelmaking and hot rolling practice and production procedure in cold rolling.

All equipment has been designed to cover a gauge range of 0.010 in. to 0.160 in. in widths up to 18 in., and although able to deal with all qualities of steel, the mill will be primarily employed on the cold rolling of low carbon steels in all tempers from hard bright unannealed to dead soft and intermediate tempers in the annealed condition.

The precision and consistency obtained on all processes in this installation renders the cold rolled product eminently suitable for use on automatic presses.

STEEL CHIEF ON PRODUCTION IN "BOOM" CONDITIONS

ALTHOUGH production at any cost might have to be undertaken in boom conditions, it was often better to miss a portion of the "top hump" in demand rather than be saddled with irreducible costs, said Mr. F. Rowe, managing director of K. & L. Steelfounders & Engineers, Limited, last Friday. He was speaking on the role of the managing director at a British Institute of Management conference on the strengthening of management, held at Leamington Spa.

Mr. F. W. Oakley, chairman of the institute's education and training committee, said its recent report on management development within companies emphasized that they did pay off, however expensive the schemes were.

Personal

South-Western NCB Area Manager Retires

AFTER eight years as Area general manager of the No. 4 (Aberdare) Area, South-Western Divisional Coal Board, Mr. J. A. HAYES, who is 60 years of age, retires today (Friday).

His first mining appointment was with the Babbington Coal Company in 1917.

From 1930 until 1939 Mr. Hayes was overman and development engineer at Thoresby Colliery, under the Bolsover Colliery Company, Limited. In 1939 he was appointed manager of Clipstone Colliery and in 1945 was made production engineer to the company. When the industry was nationalized in 1947, Mr. Hayes was appointed Area planning and development engineer in the No. 3 Area of the East Midlands NCB and became successively sub-Area manager and, in 1950, assistant production director for the Division. He was appointed to his present position three years later.

MR. J. A. HAYES

Lord COHEN OF BIRKENHEAD has been elected president of the National Society for Clean Air in succession to Sir Hugh Beaver.

Mr. GERALD YOUNG, senior warden of the Cutlers' Company and chairman of Tempered Group, Limited, Sheffield, is visiting New York, Detroit, and other cities in the US to appoint distributors for various group products, including automotive and agricultural springs.

After 35 years Mr. JOHN CAMPBELL, deputy general manager of the repair department of Barclay, Curle & Company, Limited, shipbuilders and repairers, of Glasgow, retires this week-end. He was appointed assistant repair manager in 1926 and to his present post in 1958.

Manager of the wheel and tyre department at the Rotherham (Yorks), works of Steel, Peech & Tozer, branch of the United Steel Companies, Limited, Mr. GEORGE BENTLEY is to leave, for Durgapur, India, where he will instruct and supervise the making of wheels and axles.

Mr. H. C. BUSTARD, director and general manager of the Mercantile Dry Dock Company, Limited, Jarrow, and Mr. T. A. GREENWELL, joint managing director of T. W. Greenwell & Company, Limited, Sunderland, have been re-elected chairman and deputy-chairman respectively of the North-East Coast Ship-repairers' Association.

Mr. F. L. WARING, managing director of the Coalite & Chemical Products, Limited, group of companies, has been elected chairman of the Association of Chemical and Allied Employers. A past chairman of the Yorkshire section of the Institute of Fuel and the immediate past president of the Association of Tar Distillers, Mr. Waring was also recently elected vice-chairman of the Chemical and Allied Industries Joint Industrial Council.

Nearly 40 Years in Coal Mining

AFTER being associated with the South Wales coalfield for 38 years, Mr. J. F. Slaney, Divisional chief engineer in the South Western Division of the National Coal Board retires today (Friday). He took up his first appointment in South Wales in 1923 with Powell Duffryn, Limited, under whom he became an area manager. He had been apprenticed at the engineering works of Bellis & Morcom, Limited, and was later at the Metropolitan-Vickers Electrical Company, Limited, engineering works.

After nationalization, Mr. Slaney was appointed Area chief engineer (mechanical) in the No. 4 (Aberdare) Area, was made Divisional chief mechanical engineer in 1955 and Divisional chief Engineer in 1957. He is a Fellow of the Association of Mining Electrical and Mechanical Engineers.

Institution of Works Managers' Three New Vice-presidents

THREE new vice-presidents have been elected by the Institution of Works Managers. They are Mr. E. J. Hunter, chairman of Swan, Hunter, & Wigham Richardson, Limited, Mr. J. R. Edwards, managing director of the Pressed Steel Company, Limited, and Mr. Geoffrey Rootes, deputy chairman and managing director of Humber, Limited, and its subsidiary companies.

Mr. Hunter, who started as an apprentice with Swan, Hunter in 1930, has held office in many organizations concerned with shipbuilding, being a past president of the Shipbuilding Employers' Confederation. He is a director of the British Productivity Council.

Modernization of Yorkshire Pit

PREDICTING a "bright future" for Manton Colliery (Yorkshire), Mr. T. A. Carter, production manager for the No. 1 (Worksop) Area of the North-Eastern Divisional Coal Board, said on Saturday that Manton had still untouched a large slice of the Parkgate Seam—one of the best seams in South Yorkshire—and that the colliery itself was being completely modernized at a cost of several million pounds.

Mr. Carter told colliery officials at their annual dinner that in 1957 the pit lost £603,000. This was reduced in 1959 to £48,000, and in 1960 there was a profit of £63,000.

KIRKSTALL FORGE ENGINEERING, LIMITED—New capital plans are announced with a 7½ per cent. interim dividend on the 1,200,000 10s. ordinary shares. The plans are to split the 10s. shares to 5s., at the same time giving 1,200,000 5s. ordinary to holders of April 7 in the proportion of one 5s. for every 10s. share. The directors expect to pay a final dividend of 8 per cent. on the resultant 3,600,000 5s. shares.

WELLMAN SMITH OWEN ENGINEERING CORPORATION, LIMITED, open hearth and industrial furnace makers, etc., of London, S.W.1—The offer to acquire the ordinary stock of the Incandescent Heat Company, Limited, has been declared unconditional, acceptances having been received in respect of 97.8 per cent. of the stock. The offer will remain open for the time being on the basis of the "wholly cash" alternative consideration.

In Parliament

SALE OF STEEL SHARES

"Shabby Manoeuvring" Charge by Opposition

GOVERNMENT'S determination to return to private enterprise steel concerns still in State ownership was re-affirmed by MR. ANTHONY BARBER, Economic Secretary to the Treasury, in replying to an Opposition demand for an inquiry into the marketing of State-owned steel shares. MR. HAROLD WILSON (Lab.) had earlier referred to "very shabby financial manœuvring" in the sale of the Staveley Iron & Chemical Company, Limited, and the Llanelly Steel Company, Limited, and accused Ministers of "disposing of national assets to their friends at a substantial loss to the taxpayers."

Opening the debate, which was raised on the committee stage of the Consolidated Fund Bill dealing with the operations of the Iron and Steel Holdings Realization Agency, MR. WILSON said that a bigger issue was involved than "mere financial fiddling"—the ownership and control of an essential basic industry. The sale of the Llanelly undertaking to Duports, Limited, for £1,750,000 meant a loss to the taxpayer of £1,500,000, he contended.

The Staveley concern, and the Sheepbridge Company, Limited, originally valued at £10,500,000, were sold to Stewarts and Lloyds, Limited, for £6,000,000. The Staveley profits since nationalization were more than £1,000,000 a year, except in 1958-59.

"Engineered Depression"

Mr. Wilson asserted that the valuation was based on a depression year, and went on: "The Government engineered a depression. This cut the profits. Then they used those reduced profits to justify a cheap price when they sold those industries to their friends." The Government was not deficient in political gratitude, though it might be deficient in other qualities. It was estimated, he said, that Stewarts and Lloyds, the "beneficiaries of this public scandal," spent £269,000 in the last election on advertising designed to benefit the Conservatives.

The Chancellor of the Exchequer and his colleagues had "gloried in the way in which they had sacrificed the taxpayer," said Mr. Wilson, who added: "This serious sacrifice of State property should be fully investigated."

Mr. Wilson said that the latest episode was the sale to private individuals of the greater part of the prior charge capital of the steel industry. Securities with a nominal value of about £105,000,000 were offered by the "fairy godmother" of the Treasury at prices giving yields of about 6¾ per cent. on debentures, 6¼ per cent. on loan stock and 7½ per cent. on preference shares. "The usurers never had it so good. Even if you accept the denationalization policy, these were handed over at give-away prices." The Opposition's charge, he said, was that the taxpayer had been sacrificed to capital gains speculators.

In case after case, he maintained, if a speculator invested £10,000 he could have made £20,000 or £30,000 capital profit over the period of these sales; there had been malodorous manœuvres, and the least the Government could do was to hold an inquiry.

MR. ANTHONY BARBER, Economic Secretary to the Treasury, said that Mr. Wilson and his friends wanted to put the clock back. They wanted to renationalize the steel industry, but the British people did not. It was the firm intention of the Government that the work of the Iron and Steel Holdings Realization Agency should be substantially completed by the end of the present Parliament.

In terms of steel production, employment, and sales of products, nearly 90 per cent. of the industry had now been denationalized. In financial terms, the agency had reduced by more than three fifths the stocks it took over from the Iron and Steel Corporation in 1953. Of the 55 firms for which ISHRA became responsible in July, 1952, it now retained ownership of only Richard Thomas & Baldwins, Limited, and seven other small companies.

It had been suggested, he said, that the prior charges stock should not have been sold at all, but its sale was an essential part of the process of denationalization, and its sale could not be considered in isolation. Most of these prior charges were created in connection with the sale of the equity of the companies, and it would not have been possible in many cases to have sold the equities at the prices at which they were sold without creating the prior charges. In the case of the Consett Iron Company, Limited, the combined sale of equities and prior charges had resulted in a surplus of £2,500,000 and he could give other examples.

This large operation, the largest offer for sale of industrial securities ever undertaken in the country, was an important contribution to the Government's policy of denationalization which it expected to substantially complete during the lifetime of the present Parliament. There were really 12 separate stocks in seven different companies, and the gross proceeds would amount to about £85,000,000. Mr. Wilson had asked what was the cost of the operation, and it could be stated as the difference between the gross proceeds, £85,300,000, and the net proceeds, £83,500,000, a cost of £1,800,00. He was satisfied that the underwriting commission was satisfactory.

It had been suggested that the whole operation had involved the agency and the taxpayer in a loss of about £20,000,000, but the agency had sold the undertakings back to private enterprise in two stages—first the equity, and then the prior charge holdings. Any split of the cost price to the agency between these two parts

was impossible. The transactions had to be looked at as a whole. Present indications were that the ultimate proceeds would be no less than the book value to the agency.

MR. W. E. PADLEY (Lab.), said that the Government policy towards the Steel Company of Wales, Limited, had plundered the public purse of just over £60,000,000. It was a sordid indictment of the Government. MR. MICHAEL FOOT (Lab.), said the Government was in a difficulty because if Richard Thomas & Baldwins stayed nationalized and continued to be so successful, and to show up so many other steel firms, it would be a standing proof of the success of nationalization.

MR. RICHARD WOOD, Minister of Power, said that demand for steel had been growing steadily during 1960, and surveys showed that it was likely to go on strengthening. Referring to the progress of schemes at RTB and at Colvilles, he said the works at Newport were expected to come into operation in the spring of next year. The project was originally designed to produce about 1,000,000 tons a year, but that was to be expanded to about half as much again. Colvilles' scheme was expected to come into operation in July next year. With the expansion which had been approved, it would have a capacity of about 500,000 tons of sheet steel a year instead of the original 230,000 tons. He had agreed with the company that the review of the total amount of the Government loan of £50,000,000, which was to have taken place after October 1, 1962, should take place in the first quarter of next year. Otherwise it would be a dead letter.

COAL OUTPUT AND ICI

MR. NORMAN PENTLAND (Lab.) asked if a directive had been given to the National Coal Board regarding steps to maintain production when Imperial Chemical Industries, Limited, completed the planned conversion of part of its industry from the use of coal to oil for energy purposes. In the same question, he referred to the conversion by the Gas Board from the use of coal in the production of gas to the use of liquid methane.

MR. JOHN C. GEORGE, Parliamentary Secretary to the Minister of Power, said in a written answer that no directive had been given. It was for the Coal Board to determine what measures should be taken to maintain output in face of competition from other fuels. He added that no decision had yet been taken on the use of liquid methane by the gas industry. In any event, it was expected that both industries would continue to use coal in substantial quantities.

MINING AND THE COUNTRYSIDE

QUESTIONED about the effect of mining developments on the natural beauty of certain areas of the country, MR. JOHN C. GEORGE, Parliamentary Secretary to the Minister of Power, said that three representations had been received in the past year, one of which was from Scotland and related to the pollution of beaches in the Kirkcaldy area.

The amenity problems associated with coal and mining were best dealt with, he said, by discussions between the National Coal Board and the authorities concerned.

THE HOUSE adjourned for the Easter recess yesterday (Thursday) until April 11.

BIGGEST iron ore cargo ever to be imported into the country is due to arrive at the Tyne early next month.

Trade Delegation to South-East Asia

TRADE delegation, jointly sponsored by the Board of Trade and the Federation of British Industries and organized by the FBI will leave on April 11 to visit seven countries in South-East Asia, under the chairmanship of Sir Edward Thompson, chairman and managing director of John Thompson, Limited.

After tours lasting a fortnight, the entire delegation will meet in Singapore for a two-day conference with HM trade representatives accredited to all the countries concerned.

The missions will include the following: — Malaya-Singapore: Leader, Mr. M. Pearce, George Wimpey & Company, Limited; Mr. D. G. W. Acworth, director of the General Electric Company, Limited; Mr. A. Renfrew, Imperial Chemical Industries, Limited, and Mr. A. F. J. Mullins (secretary), FBI. Thailand-Burma: Leader, Mr. D. E. Bird, Ewbank & Partners; Mr. M. C. Clear, director of Hawker Siddeley Industries, Limited; Mr. A. R. Robinson; Mr. A. D. Walwyn, Platt Bros. (Sales), Limited, and Mr. N. H. Cork.

Philippines-North Borneo: Leader, Mr. A. W. Berry, British Engineers' Association; Mr. D. I. Allport, Metal Box Company, Limited; Mr. G. Hartley, Rose, Downs & Thompson, Limited; Mr. P. C. E. Kirby, Mr. F. J. Knightly, and Mr. T. B. Fahy (secretary), Birmingham Chamber of Commerce. Indonesia: Leader, Sir Edward Thompson; Mr. L. E. C. Ballinger, Vickers, Limited; Mr. D. G. Hemmant, British Mining Equipment, Limited; Mr. R. L. Scott; Mr. J. V. Gray, and Mr. H. M. Bullard (secretary), London Chamber of Commerce.

ICI's £6,000,000 Modernization Plan for Billingham

MORE than £6,000,000 is to be spent by Imperial Chemical Industries, Limited, on modernizing over the next two years a large section of its Billingham factory. A process, which has been developed by the Billingham Division for making hydrogen at a lower cost, will use light oil as a raw material in place of the coke which is the present main basis of making hydrogen.

As already mentioned, the factory's coke ovens, now nearing the end of their useful life and currently using about 600,000 tons of coking coal annually, will be shut down at the end of this year.

Recent Wills

VAUGHAN, ERNEST J., a director of Metalcraft (Willenhall), Limited, sheet metal and plate workers, of Willenhall (Staffs) £30,348

HOLGATE, BENJAMIN R., former director of W. & S. Summerscales, Limited, domestic machinists, of Keighley (Yorks) £24,814

WEAVER, H. T., a former president of the Birmingham, Coventry and West Midland branch of the Institute of Foundrymen £20,313

RUSHWORTH, MRS. J. R., director of Power House Components, Limited, cable and hose reel manufacturers, of Nottingham £11,278

KAY, C. B., former works manager and director of the Sunbeam Motor Company, Limited, Wolverhampton, and later of George H. Alexander Machinery, Limited, Birmingham £72,260

GODBER, LEONARD, a local director and general manager (services) of Newton, Chambers & Company, Limited, Thorncliffe, near Sheffield, with which company he served 37 years £9,692

Law Cases

Steel Charge Acquittal

JUDGE'S DIRECTION IN SCOW CASE

AT Glamorgan Assizes at Cardiff, Mr. Richard Hubert Davies (50), site agent, was found Not Guilty of charges of larceny of steel and aiding and abetting in forgery. On the direction of Mr. Justice McNair, the jury acquitted Mr. Davies on nine charges of taking steel from the Steel Company of Wales, Limited, three of aiding and abetting another man to forge repair orders, and three charges of aiding and abetting the same man to utter the forgery of repair orders. Mr. Davies was discharged.

Edward John Williams (43), general foreman, who pleaded Guilty to one charge of stealing a quantity of steel plate from the Steel Company of Wales, between March 8-9, 1959, was sentenced to 12 months' imprisonment. He asked for three other offences of larceny involving steel plate to be taken into consideration.

The judge said that the prosecution's case against Davies was that a man named James carried out the actual taking away of the steel, but that he did so on the direction of Davies, with his knowledge and by his instructions. The case against Davies depended almost solely on the evidence given by James, who had been dealt with and sentenced on these counts. "James told you that he received his instructions either from Davies or someone else—"Mr. X," who has not been charged. He said that Davies and "Mr. X" seemed to be working independently from each other, so that you cannot tell which of these two men, Davies or "X," was responsible for the offences."

The judge said it might be thought that there was a case of grave suspicion, but the jury would not be entitled to convict a man upon suspicion. From the material put before the court by the prosecution, there was no evidence on which a jury could properly be asked to say that Davies was guilty, he said.

Miners Widow Awarded £6,298 Damages

WIDOW of "an ambitious and exceptional" man was awarded damages of £6,298 at Leeds Assizes. She was Mrs. Marjorie Ball (46), who sued the National Coal Board in respect of the death of her husband, Mr. Robert Hamilton Ball, a hewer, who was killed by a runaway mine car at Roundwood Colliery, near Wakefield (Yorks), in January, 1957.

For the plaintiff, Mr. Alastair Sharp said that her husband was an ambitious and exceptional man who had obtained his shotfirer's certificate and was studying three nights a week for his deputy's certificate. At the age of 38 he was "on the way up." Average net earnings were agreed at £13 18s. 7d. per week and he submitted the dependency was at least £10 per week. There were two children, now aged 18 and 13.

Mr. G. F. Peter Mason, for the NCB, said there seemed to be some issue whether the man had ambition to go further and he suggested that £10 per week for pecuniary loss was far too high.

Mr. Justice Fenton Atkinson said that whatever his ambition and energy might have been, Mr. Ball was working at a hazardous trade and it might have been that if he had not become a deputy his earnings might have declined. One could almost set off the two factors one against another.

DAMAGES OF £300 were awarded to Mr. Edward Cullen, a miner, in the Court of Session at Glasgow. He had sued the National Coal Board for damages of £3,000 for the loss of two of his finger tips in an accident at Cardowan Colliery, near Glasgow. The jury fixed damages at £600, but held that plaintiff was 50 per cent. to blame for the accident.

Transformer Price Agreement

ALL restrictions in the agreement of the Transformer Manufacturers' Association were declared against the public interest by the Restrictive Practices Court in London last Saturday, and the agreement was made void. The association, which consists of 10 members, who are the big companies making the largest high voltage power transformers, claimed that the ending of the agreement would bring transformer prices down to an unreasonable level detrimental to their customers, because of possible depreciation of quality.

In a reserved judgment, Mr. Justice Russell said the court was not satisfied that, as a result of reductions in prices, there would be a curtailment of research or development such as would deprive purchasers from obtaining transformers of increased power and rating afforded them by reason of the price restrictions. So far as quality was concerned, the court again did not envisage any reduction causing substantial loss of benefit to the purchaser.

So far as the export agreement was concerned, its operation resulted in level tendering, a practice generally disliked by purchasers and which must tend to produce in them a spirit of resistance which could not be a good thing for export earnings. The court was not satisfied that the removal of the home price restrictions would cause a reduction in the earning of the export business in transformers.

GEC's Success in Dip.Tech. Awards

PRESENTING awards at the annual dinner recently of the Witton Engineering Works Apprentices Association, of the General Electric Company, Limited, the general manager of the Witton Works, Mr. T. H. Kelsey, referred to outstanding successes in the Diploma of Technology awards.

MR. T. H. KELSEY

GEC had been one of the pioneers of the Dip.Tech. and its entrants had done "amazingly well." In all the faculties of electrical engineering throughout the entire country 210 young men had been awarded Diplomas in Technology. Of these 139 were awarded in Birmingham and of that number 123, or 95 per cent. were GEC students. So far, in the country, 18 first class honours had been awarded, 12 of them in Birmingham and all 12 were to GEC students.

Speaking at the dinner Mr. Arnold Lindley, GEC chairman and managing director, said that a course of expansion had been plotted and there were challenging opportunities for younger men to come forward to posts of responsibility.

Alfred Herbert Machine-tool Orders Outstrip Output

ORDERS received throughout 1960 and in the current year to date by Alfred Herbert, Limited, machine tool manufacturers and distributors, of Coventry, have been in excess of output, and promised deliveries have lengthened, states Col. C. W. Clark, chairman. Output is increasing satisfactorily, however, despite the difficulty of obtaining early deliveries of some components and inability to recruit skilled labour as rapidly as required. Col. Clark adds that the overall picture of the machine-tool industry is encouraging, although the improved prosperity is not entirely uniform.

The substantial backlog of orders for Herbert machines included nearly 40 per cent. for export. It was only in India that there was cause for concern, due to the state of uncertainty in which business was conducted. For many years India was the best export market for British machine tools, but the UK had now been overtaken by West Germany, due almost entirely to payment problems. In most other markets, the position was "most encouraging." There was a big weight of orders in hand from Australia, but there were signs of change as stricter control of imports might be introduced in the near future.

In the last year the group had introduced a number of new machines with success, and development engineers had a full programme. At the Edgwick Works, a new foundry was nearing completion, and a light production shop was in the earlier stages of construction.

Appointments

Mr. KENNETH ARTHUR OLIVER has been appointed chief metallurgist of the Brightside Foundry & Engineering Company, Limited, Sheffield.

Mr. A. J. BOYCE has been appointed manager of the newly-formed research and marketing division of Romac Industries, Limited, London, N.W.9.

Chief scientist for the past three and a half years at the No. 6 (Monmouthshire) Area of the South-Western Divisional Coal Board, Mr. J. T. THIRLAWAY has been appointed to a similar position in the No. 6 (North-West Durham) Area of the Durham Divisional Coal Board.

London born, 40-year-old Mr. R. L. GLAISHER has joined Adrema (Holdings), Limited, London, W.3, as oversea operations manager in charge of the export and merchandising activities to spearhead the new, intense export drive in both new geographical and technical territories.

Following the retirement of Mr. W. S. Mowat, for the past 15 years the Ferodo, Limited, district manager in Edinburgh, Mr. A. G. THOMSON, hitherto the company's district manager in Aberdeen, has been appointed his successor. He will retain responsibility for the Aberdeen depot.

Mr. J. A. FORD, home sales manager of Renold Chains, Limited, precision chain engineers, etc., of Manchester, has been appointed sales director of the company's Australian subsidiary, and takes up the post in June. He will be succeeded as home sales manager by Mr. F. T. STANFORD, at present in charge of internal home commercial activities. Mr. A. E. CLOUGH will take over Mr. Stanford's position.

Industrial units division of Leyland Motors, Limited, has been reorganized and two new appointments have been made. Mr. A. R. J. BRUCE, formerly assistant export manager of the company, becomes sales manager of the division, and Mr. P. J. REDFERN, formerly sales engineer, is now assistant sales manager. Mr. C. W. SPENCE continues as sales superintendent of the company's manufacturing agreements division, which is now separate from the industrial units division.

AEI's Increased Sales

SALES of products of Associated Electrical Industries, Limited, during 1960 increased to £215,300,000 (£208,440,000) and the group net trading profit of £4,722,439 compares with £4,746,987. The dividend is unchanged at 3s. per £1 ordinary.

The order-book is well filled and an order for 135 electric locomotives for South African Railways will be completed in the first half of this year—ahead of the contractual time. Another order, also from South Africa, has been received and delivery of the 113 sets of electrical equipment for motor coach multiple unit stock destined for the Cape Reef systems has already been started. At home AEI is one of the major contractors supplying electrical equipment for the modernization of British Railways.

The year 1960 was the first full year's trading operations after the recent reorganization of the greater part of the group into product divisions. Initial problems, state the directors, have now been largely overcome.

DIPLOMAS IN TECHNOLOGY have been won by six apprentices trained under the Birfield, Limited, group apprentice training scheme.

Orders Placed

STEELMAKING PLANT

Head Wrightson Wins £3,500,000 Order

ORDER for a basic oxygen steelmaking plant—the first export order to be secured by a British firm for the supply of a complete plant using any of the new oxygen steelmaking processes—is announced by Head Wrightson (Australia) Pty., Limited, a subsidiary of Head Wrightson & Company, Limited. It is included in orders won in the face of strong competition and valued at about £3,500,000 from the Broken Hill Proprietary Company, Limited, and from Australian Iron & Steel, Limited. They include the design, manufacture, and erection of a scree ore treatment plant, a basic oxygen steelmaking plant, and a tinplate cut-up line.

The scree ore treatment plant will treat 1,200,000 tons per year of scree deposits taken from the flanks of Iron Knob and will have an output of 800,000 tons of concentrate averaging about 60 per cent. iron content. The engineering for this plant will be carried out by Head Wrightson Minerals Engineering, Limited, Sheffield.

The basic oxygen steelmaking plant, which will have an output of about 500,000 tons of steel per year, will be installed at Whyalla in South Australia and will be engineered in the UK by Head Wrightson Iron & Steel Works Engineering Limited, Thornaby-on-Tees.

Second Tinplate Cut-up Line

On this project Head Wrightson is responsible for the supply of two 100-ton basic oxygen furnaces together with the oxygen lancing equipment, fume ducting and fume conditioning equipment, the steel plant buildings, together with the hot metal and slag ladles, steel transfer cars, etc.

The tinplate cut-up line will be built to the designs of the Head Wrightson Machine Company, Limited, Middlesbrough, and is a repeat order, a similar line having gone into production a few months ago at the Port Kembla Works of Australian Iron & Steel. Initially this line will be used to enable steel strip of up to 40 in. wide in coils weighing up to 45,000 lb. to be cut up into sheets suitable for hot dip tinning. The line is designed to operate at speeds of up to 800 ft. per minute.

Near the entry end, and before the flying shear, flying micrometers and pinhole detectors will be installed which will enable sheets which are off gauge, or have a surface defect, to be automatically rejected in the classifying and piling device which follows the shear. The classifier on the line recently installed is the first four pile flat topped classifier with single sheet classification to be installed anywhere in the world.

The engineering for the whole of this line and part of the equipment will be supplied by the Head Wrightson Machine Company, but the major part of the equipment will be manufactured in Australia. Equipment and services valued at almost £1,000,000 sterling, will be supplied from the Head Wrightson Works on Tees-side.

CONTRACT HAS BEEN PLACED by the Central Electricity Generating Board with Holdan Engineers (London), Limited, for the supply of ash-handling plant for the new "B" power station under construction at Blyth (Northumberland).

STRUCTURAL ENGINEERING firms, Redpath, Brown & Company, Limited, of Edinburgh, and Fleming Bros., Limited, of Glasgow, are to share the £600,000 steelwork contract for the car factory which Rootes, Limited, is building at Linwood (Renfrewshire).

CONTRACT FOR the design and manufacture of the electrical propulsion machines and control gear for the second British nuclear submarine, being built by Vickers-Armstrongs (Shipbuilders), Limited, has been awarded to Laurence Scott & Electromotors, Limited.

HEYES & COMPANY, LIMITED, Wigan, has received an order from Associated Electrical Industries, Limited, for a five-level Wigan Type 40 shaft signalling indicator system and gate interlocking system for installation at Hucknall No. 2 Colliery, No. 6 Area, East Midlands Division of the NCB.

FOURTH OVERSEA order for shotblasting machines to remove mill scale and rust from plates and sections used in shipbuilding has been obtained by Spencer & Halstead, Limited, Ossett (Yorks). The order has been placed by the A/S Bergens Mekaniske Verksteder, Bergen, and is valued at £17,000.

CONTRACT FOR two 84,000 h.p. hydraulic turbines has been awarded to the John Inglis Company, Limited, Toronto, a subsidiary of the English Electric Company, Limited, by the Hydro Electric Power Commission of Ontario. Design work and model testing will be done in the UK by the English Electric Company's hydro-electric division at Netherton and Rugby.

AN ORDER WORTH nearly £100,000 has been received by Richardsons Westgarth (Hartlepool), Limited, a subsidiary of Richardsons, Westgarth & Company, Limited, boilermakers and ironfounders, etc., of Wallsend-on-Tyne, for the supply of three 14,700 sq. ft. surface three-pass, steam condensers and associated equipment. The order was received through Brown-Boveri, of Switzerland.

SECURED IN THE face of strong international competition, Millspaugh-Wimpey, Limited, London, S.W.1, has won a £3,000,000 contract for the establishment of a compete paper mill in Yugoslavia. The agreement covers the design and supply of all plant and equipment as well as technical assistance in the mill's erection. Further inquiries have already been made about the possibility of carrying out more work in Yugoslavia.

AN ORDER FOR thermal generating plant for the Electricity Supply Commission of South Africa has

been received by Associated Electrical Industries, Limited. Two 125 mW. turbine generator sets have been ordered, together with condensers and feed-heating equipment, for delivery to the Komarti power station in the Transvaal. The units are claimed to be the largest yet ordered by South Africa and the contract is due to be completed in 1964. Arrangements are being made for the condensing and heat-exchanger plant for these machines to be made locally in South Africa to AEI design.

£400,000 Brazil Order for Stewarts and Lloyds

CONTRACT worth nearly £400,000 for the initial supply of seamless steel oil well casing, together with tubing and line-pipe for Petroleo Brasileiro, SA (Petrobras), the Brazilian State oil company, has been given to Stewarts and Lloyds, Limited, of Glasgow. The contract was "secured in the face of strong international competition, not only in respect of credits, but as regards price and delivery," states Stewarts and Lloyds.

The deal provides for payment on extended credit terms insured by the Exports Credits Guarantee Department. Materials for the order, part of which are for the oil fields in the Bahia region, are being supplied from the Stewarts and Lloyds' works at Clydesdale, near Glasgow, and Corby (Northants).

Peak £105,000,000 Order-book for Machine-tool Industry

ORDER-BOOK of the British machine tool industry rose to a new record of £105,400,000 at the end of 1960, almost twice as much as at the end of 1959. Net new orders in December amounted to over £10,000,000 of which over £3,000,000 were from oversea. This figure compares with just over £7,000,000 ordered in December, 1959, of which those for export were under £1,000,000. Home deliveries rose to £6,300,000 from £5,615,000, and exports to £2,261,000 from £1,690,000.

Reporting these figures, the Machine Tool Trades Association states that the value of net new orders during 1960 was over £140,000,000, or 79 per cent. more than in 1959, with substantial increases in orders from both home and export markets. A spokesman for the association said that indications were that the better trend was continuing.

The Design Scholarship Selection Board of the association has made awards to 13 candidates whose employers have agreed to release the students for the duration of their two-year post-graduate course at Manchester College of Science and Technology on machine tool design.

Roof of the copper smelting plant of McKechnie Bros., Limited, Widnes (Lancs), was shattered and extensive damage caused when the furnace exploded last week. A spokesman for the firm said the explosion had been caused by the failure of the furnace floor.

Closer Ties Between Metal Institutes

PROBLEMS of the closer co-operation between the three societies have recently been examined by the Councils of the Iron and Steel Institute, the Institute of Metals, and the Institution of Metallurgists. After careful consideration, they have concluded that amalgamation of the three societies would not be practicable within the foreseeable future, but it has been decided to set up a permanent joint consultative committee which will meet regularly and advise individual councils on all activities and questions of common interest.

The three councils state they are convinced that every qualified metallurgist should be a member both of the professional institution and of his appropriate scientific and technical institute, and should contribute to and influence the work of both. With this in view, the council of the Institution of Metallurgists has altered the standard subscriptions payable by members, enrolled graduates, and enrolled students of the institution resident in the UK.

By agreement of the three Councils, all those in the Institution of Metallurgists who pay these revised standard subscriptions will automatically have the right to apply for membership of one of the two institutes without liability for the payment of a further membership subscription to that institute.

New and Intricate Refractory Problems

DEMAND for specialized refractories used by the steel industry was particularly heavy and despatches were almost 50 per cent. higher than the previous record established in 1957, states Mr. Roland A. Kirkby, chairman of General Refractories, Limited, in his annual review. Trends in iron and steel making techniques which were becoming apparent a few years ago calling for still higher temperatures and faster driving rates, and also the introduction of oxygen steelmaking processes, had uncovered many new and most intricate refractory problems.

Research work on these problems initiated and then developed by the company's laboratories had culminated in further significant improvements to basic, alumina, silica, and fireclay products, all of which had now been tried and proven.

There were signs of an easement of demand in certain sections of the steel industry and a consequent levelling off in production. This was causing an increase in stocks of refractories held by consumers with some restriction of current ordering. So far this had had no impact on the company's level of production which still had a substantial backlog of orders.

A RECENT ADDITION to the Crompton Historic Collection of Crompton Parkinson, Limited, at Chelmsford, is an old oil circuit breaker which was installed at the Richard Garrett Engineering Works, Limited, Leiston (Suffolk), in 1916 and has only just been removed from service. The breaker is still in good working condition. A second oil circuit breaker was also obtained from the same company and this has been presented to the Science Museum at South Kensington, where it is the oldest of its type.

MINE-CAR CIRCUITS IN SCOTLAND

Present Practice Reviewed

The decision to use larger vehicles for transport in mines to replace the traditional pit tub has had an immense influence on the design of both new and reconstructed collieries. The effects of the use of mine cars in Scottish pits were reviewed in a paper by Mr. J. W. Pirie, chief engineer of the Scottish Divisional Coal Board, which was presented to the Mining Institute of Scotland on September 21, 1960. The paper is given in abridged form.

ALTHOUGH mine cars were first introduced into coal mines in Great Britain some 20 years ago, it is only over the last 10 years that the number of mines employing cars, in place of the traditional pit tubs of small capacity, has assumed significant proportions. Mine cars can be defined as vehicles having a capacity not less than 60 cu. ft. and may be divided into two main types, namely, solid-bottom cars or drop-bottom cars. The latter type is merely mentioned in passing since this paper is confined to the problems of handling solid-bottom mine cars in pit bottoms and at the surface.

The National Coal Board was quick to realize that the adoption of mine cars would develop rapidly and that the handling of these cars at loading points, on underground transport systems; in pit bottoms and shafts; and on surface circuits, wou'd demand completely different techniques from those which evolved throughout the years in the handling of pit tubs. It was appreciated that these new techniques would be based on mechanical handling methods, as distinct from the mainly manual methods employed with pit tubs, and that considerable advantages would accrue from the establishment of a range of standard mine cars.

In consequence, and soon after nationalization of the coal mines, a committee was formed which drew up a range of 12 mine cars, varying in capacity from 61 cu. ft. (approximately 1½ tons of coal) to 142 cu. ft. (approximately 3¼ tons of coal), and in overall dimensions from 6 ft. long by 3 ft. 9 in. wide by 4 ft. 6 in. high above rail, with a 2-ft. 3-in. wheel base, to 12 ft. long by 4 ft. wide by 4 ft. 6 in. high above rail with a 5-ft. wheel base. Having determined and standardized the capacities and overall dimensions of a limited number of mine cars, the committee then proceeded to standardize the method of construction, the detailed design of wheel and axle assemblies, the detailed design of springs, the standard under-car clearance, dummy axles for engagement by decking rams, creepers, cage stops, etc., and tippler and brake engagement brackets.

The standard range of mine cars was originally circulated in 1948 as an information circular with the approval of the NCB, recommending that the range be used wherever possible in new mines and for reconstruction schemes.

After some years of operating experience, the specification was reviewed, modified in certain respects and the 1½-ton capacity group omitted since it was considered that the specification was not suitable for a car of this capacity and resulted in it being unduly expensive.

The modified specification embracing cars from 82 to 138 cu. ft. capacity was issued in March, 1957, and their adoption was made mandatory from April 1, 1957.

Later in 1957, a simpler specification was issued for cars of 61 to 81 cu. ft. capacity and this specification was made mandatory from October 1, 1957.

In both cases, however, provision is made for exemption from the specification to be granted in special circumstances, the right of exemption being vested in the directors general of production or reconstruction at headquarters.

Application of Standard Mine Cars

The design and layout of a modern colliery, from the underground loading points to surface tipplers and stockyard, are based on the mine car employed. In the Scottish Division of the NCB, this fact was very much in mind when selecting mine cars for new collieries and major reconstruction schemes. It has also recognized that considerable technical and economic benefits are to be gained by keeping the variety of sizes and types of cars to as few as possible, consistent with the restrictions imposed by existing shafts and cages.

It is noteworthy that 26 of the 27 solid-bottom mine-car installations operating or projected in the division are equipped with cars conforming to the standards, except for minor differences for which exemptions have been granted. The single exception is the installation at Comrie Colliery, West Fife Area, where the 3½-ton capacity mine cars were first installed early in 1940.

The main features and characteristics of mine

cars which affect the design of circuits are listed and discussed as follow: —

Physical Dimensions.—The plan area occupied by the standard mine cars per ton of their carrying capacity is only some 60 per cent. of that occupied by the average pit tub. Thus, standage areas in a mine-car circuit are less than would be required for pit tubs for an equivalent output.

Laden and Unladen Weight.—The greater weight of a mine car in relation to a pit tub necessitates the employment of mechanical handling appliances instead of the old manual methods which are largely used with pit tubs. Thus, compressed-air or hydraulic rams are required to set the cars in motion for decking them into cages or placing them in tipplers, etc. Gravity, may, of course, be used to set them in motion to move from one position to another.

To bring mine cars to rest requires the absorption of an appreciable amount of energy, and robust stops designed to bring a car to rest with a uniform retarding load over a prescribed distance are necessary. These stops may take the form of compressed-air cylinders, hydraulic cylinders, or friction brakes acting on the dummy axles or braking brackets specially provided for the purpose on the standard mine cars. The importance of robustness of these devices will be appreciated when it is realized that a retarding force of 4.8 tons is required to bring a 3-ton capacity, 1½-ton tare, mine car to rest in 6 in. when travelling at only 4 m.p.h.

Rolling Friction of Ball or Roller Bearing Wheels.—Where gravity is employed in mine-car circuits, very much flatter gradients can be employed than those required for pit tubs equipped with fixed wheels and axles operating in open pedestals. In consequence, the difference between the highest and lowest points is appreciably less in a mine-car than are common in pit-tub circuits.

Conversely, the low frictional resistance of mine cars combined with their weight, aggravates the problem of stopping.

Wheel Base.—The complete range of standard mine cars have wheel bases varying from 2 ft. 6 in. to 5 ft. compared to a very common wheel base of 1 ft. 6 in. for pit tubs. As a result, very much larger curves are required in a mine-car circuit, both in the track and in crossings and turnouts, than are common in pit-tub circuits.

Applying the formula laid down by the NCB for the minimum radius of curves for uncoupled four-wheeled vehicles without gauge widening to standard mine-car wheels, the resulting radii to the centre line of the track with the different wheel bases and tail gauges are shown in Table 1.

TABLE 1.—*Values of Minimum Radius of Curve in ft. at Centre Line of Track for Various Rail Gauges and Wheel Bases.*

Rail gauge.	Minimum radius in ft. for various wheel bases.					
	2 ft. 6 in.	3 ft. 0 in.	3 ft. 6 in.	4 ft. 0 in.	4 ft. 6 in.	5 ft. 0 in.
ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
2 0	20 4½	24 8	28 11	33 3	37 6	41 9
2 6	20 1½	24 5	28 8	33 0	37 3	41 6
3 0	19 10½	24 2	28 5	32 9	37 0	41 3

In comparison, the calculated minimum radius for a pit tub with standard 10½-in. dia. wheels and a wheel base of 1 ft. 6 in. is 8 ft. 10 in. It it normal practice in Scotland to increase these calculated radii by 50 per cent. and it follows that the extent of a mine-car circuit employing curves is very much greater than one with pit tubs, even allowing for the saving in standage space.

Survey of Mine-car Circuits

Mine cars are being wound through 22 shafts in the Scottish Division and the winding of cars is projected in a further five shafts, although two of the latter schemes have been deferred. In addition, solid-bottom mine cars are being hauled up three surface drift mines and large 10-ton capacity cars are being employed on a surface railway system in the Lothians Area. These figures exclude skipwinding shafts, and it is not proposed to deal with underground mine-car circuits feeding skips.

Surface circuits in operation and those projected fall into three types, namely, traverser, backshunt, and turntable circuits, and the numbers of each type are as follow: —

Traverser Circuits.—Thirteen circuits are in operation and four circuits are projected, with the traversers close to the shaft. One circut is in operation with the traversers remote from the shaft. In addition, there are two close traverser circuits operating with pit tubs and two single traversers at the terminal end of two surface railway systems.

Backshunt Circuits.—Five circuits are in operation plus one mine-car backshunt circuit at a surface drift mine gantry and one circuit at the terminal end of a surface railway from a surface drift mine.

Turntable Circuits.—Two circuits are in operation and one circuit is projected.

It will be noted that there is a decided preference in the division for traverser circuits. It is significant that five out of the eight backshunt or turntable circuits are associated with double-winder installations having four cages in the shaft, where it has been impracticable to apply the traverser system.

The advantages of traverser circuits over the other two types which have influenced adoption of the system on such a large scale (at least one traverser circuit is installed and operating in seven of the eight areas of the division) are listed below: —

(1) Free running of mine cars is practically eliminated and they are positively controlled throughout the circuit.

(2) Only one man is required to operate the entire circuit. This man combines the duties of a banksman, traverser, driver, and tippler operator and could (and, indeed, on one installation does) operate the automatic winding engine by push buttons from bank.

(3) The car hall is much smaller and less costly than the building required for a gravity circuit using backshunts or turntables.

(4) It requires an absolute minimum of equipment. The two traverser carriages take the place of front and rear stops at the shaft and tipplers, mine-car brakes and stops throughout the circuit, backshunts or turntables, creepers, tracks, crossings, and turnouts.

(5) The system permits direction of decking on the surface to be determined without regard to the direction in the pit bottom, which is usually dictated by the underground layout. This means that the car can leave the cage on the same side as it enters in the pit bottom and shuttle-car stops can be employed. These stops are very much simpler and lighter than other types of car stops in cages.

Unlike circuits on the surface, where a free choice is usually possible, pit-bottom circuits are usually dictated by circumstances. This is particularly so in existing collieries, when mine cars are introduced as part of a major reconstruction and existing pit bottoms have to be utilized. Even in new sinkings, freedom of choice is sometimes restricted by the position and direction of the main roadways in relation to the shaft, while, in other cases, it is possible to adopt any desired system.

These variables are well illustrated at a current project where a new shaft is being sunk at an existing colliery. Winding in the new shaft will take place from two levels, the upper level coinciding with the present winding level and the lower level being in solid ground. The shaft intersects an existing road at the upper level and therefore an in-line pit bottom, with a locomotive road passing by the shaft, had to be adopted. No such restrictions apply at the lower level where a backshunt circuit is being employed.

A survey of pit-bottom arrangements existing or projected in the division reveals quite a different pattern from that shown on surface circuits. Of the 36 pit bottoms involved, seven are traverser circuits, six are circular loop circuits, 10 are backshunt circuits, and the remaining 13 are in-line pit bottoms.

ROOF CONTROL IN THE US

MOST coal mines in the US have for many years operated under shallow cover, at depths that rarely exceed 300 ft. As more coal is being mined it is becoming increasingly necessary to work at greater depths to maintain the output of deep-mined coal and mining is now taking place at depths up to 1,500 ft.

Previously, when working relatively shallow deposits, roof control problems were only slight and little attention to the theoretical applications of the technique of strata control was necessary. However, pillar sizes that provided adequate support at 200 ft. are now thought to be completely inadequate at 1,200 ft.

According to the January, 1961, issue of Mechanization, steps are now being taken to apply the British pressure arch theory, and in the development of the Loveridge Mine in north-west Virginia, an attempt to relate overburden thickness to the distance between entries is being made. Although experience to date with the application of this theory is limited, it was found that at Loveridge the greatest roof stresses were found in the extreme entries adjacent to the outside pillars, thus confirming the general findings of British practice.

In the practical application of the techniques of roof control American mining engineers are also showing interest in British methods. In recent years individual hydraulic jacks have been introduced into US coal mines and their quick-setting features and the fact that they can be retrieved with safety from a remote position has promoted considerable testing and examination. However, one principal objection to their application has been the weight of the individual prop, which is well over 100 lb. for the larger size. This disadvantage is likely to be overcome and it is believed that a prop with a maximum weight of 50 lb., yet offering a resistance to roof movement of 8 tons, has been developed.

It is expected that the new prop will be ready for marketing during this year.

Trials are also being made with self-advancing roof supports and longwall faces. In addition to the normal advantages of the longwall face found in Britain, application in the US will also mean that the ventilation system would be simplified, and the use of brattice cloths and auxiliary fans can be eliminated in the face area.

Methane Roof Layers

MOTION and turbulent mixing of layers formed by introducing a light fluid at the roof of a tunnel ventilated by a turbulent flow of a heavier fluid, with particular reference to methane roof layers in coal mines, is the subject of SMRE Research Report No. 195 by P. Bakke and Dr. S. J. Leach.

The first part of the paper describes the dependence of the behaviour of roof layers on rate of emission, slope, uphill or downhill ventilation, and ventilation velocity. In the second part, principles of prevention and remedial measures are discussed. Suggestions are made for values of air velocity which will ensure reasonably good mixing of methane layers, and prevent layers from backing against a downhill ventilation flow. The relative merits of ventilation and emission control are considered, and preliminary investigations on the use of baffles and ejectors as remedial measures are presented.

FUTURE OF COAL IN THE USSR

COAL, in terms of its calorific value, is stated by the Soviet authorities to be three times more expensive to produce than oil and 12 times more expensive than natural gas, while men cannot be spared to mine coal. This indicates that new industries will tend to be established near oil and natural gas resources and long-distance transmission of energy will be by means of oil and gas in pipelines.

In a paper presented to the South Wales Section of the Institute of Fuels and published in the March issue of the Journal of the institute, Dr. W. Idris Jones, director-general of research, scientific department, National Coal Board, outlines the energy resources of the USSR and describes mining methods, carbonization, and coal preparation.

Of the total output of approximately 500,000,000 tons of coal in the USSR during the past few years, about 25 per cent. was lignite and 15 per cent. anthracite. The output of coking coal in 1960 was expected to reach 118,000,000 tons. The coalfields differ appreciably one from another in their geological characteristics. In the Donbass, roughly 60 per cent. of the seams worked is less than 39 in. thick, while 90 per cent. of the seams in the Kuzbass is over 4 ft. thick. The Kuzbass is characterized by its numerous thick seams, which average about 7 ft. A large quantity of coking coal is mined; the Karaganda field is being rapidly developed and half the reserves are coking coals.

About 20 per cent. of the coal is won by opencast methods. Deep-mined coal is won by conventional means, 50 per cent. by longwall working and 30 per cent. by longwall retreating with single panel faces 160 to 190 yd. long. Semi-horizon mining methods are also being practised in recently-developed mines. Progress with mechanization has been very good and automation of production is now being developed. In 1956, about 70 hydraulic mining projects were stated to be under construction for the Kuzbass and it has been claimed that the power consumption would be 26 kWH/ton of coal with a coal to water ratio of 1 to 4.

The carbonization industry in the USSR is completely separated from that of coal production and the annual coke production for 1960 was planned to be 63,000,000 tons. The larger supplies of coking coals are from the Donbass, but the trend is to build new coking plants more in the Urals, Karaganda, and Kuzbass.

Blending of coals for coking is controlled by a plasto-metric test and on a volatile content basis. Soviet coke ovens are based on two designs, one using twin vertical flues and flue gas recirculation and the other being of the Koppers recirculation type with regenerative compound firing. Experiments are in progress with larger ovens and the current trend is to build the ovens as part of an integrated steel plant.

Cooling Tower Plastic Packing

THE Polygrid is a new high-efficiency corrosion resistant plastic packing and has been performance proved in more than 100 cooling tower installations. It is a moulded unit 3 ft. square and units staggered in layers throughout the packing height of the tower break up hot water into droplets as it cascades over the packing. Thus, this type of packing gives both splash and film-type cooling. Polygrid plastic packing is used extensively in Head Wrightson-Fluor "Counterflo" cooling towers, but Head Wrightson Processes will also install it in established mechanical or natural draught towers of all types. Because of its high efficiency, replacement of cooling tower packing with Polygrid will invariably increase the tower performance and efficiency.

The packing is available in high impact polystyrene for resistance to water, acids, salts, and alkalies, and in high-density polyethylene for water contaminated by aromatic hydrocarbons.

When considering the use of Polygrid it should be noted that its life should be very much longer than ordinary timber packing, which requires relatively frequent replacement.

A sample packing was displayed last month at an exhibition of plastics materials in Sheffield organized by BX Plastics, Limited, which supplied the polystyrene powder from which this sample was moulded. These packings are designed and sold by Head Wrightson Processes, Limited (a subsidiary of Head Wrightson & Company, Limited), 20-24, Old Street, London, E.C.1.

Problems of the Discharged Prisoner

METHODS of assisting discharged prisoners to find and keep employment was the main concern of a committee formed in February, 1960, under the chairmanship of Lord Pakenham. Its report, "Problems of the Ex-Prisoner," has now been published for the committee by the National Council of Social Service, Incorporated, 26, Bedford Street, London, W.C.1 (price 5s.).

The report does far more than go into the nature of the problem and recount the existing arrangements for dealing with it; the committee has done an excellent job in making valuable recommendations. It is a very readable report and one that deserves to be read widely, and especially by those in a position to make a contribution towards this vital service to the community.

Continuous Casting Research at BISRA and CNRM

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A brief history and the results of continuous casting research at the British Iron and Steel Research Association and at the Centre National de Recherches Métallurgiques are given in this article.

RECENTLY, the Steel Company of Wales, Limited, decided to install a continuous casting plant in the Abbey Works at Port Talbot, to produce slabs ranging from 27 by 6 in. up to 48 by 8 in. from 55-ton heats of oxygen converter steel. This plant will be operated under BISRA patents, and is being designed and built by the Continuous Casting Company, Limited, Weybridge (Surrey). It will be the first commercial plant in the world to operate with converter steel, and the first fully commercial plant of its type to be ordered in Europe.

It is, therefore, appropriate at this stage to review the research and development work carried out by the British Iron and Steel Research Association and its Belgian counterpart, the Centre National de Recherches Métallurgiques, which has contributed to this important advance —the decision of the Steel Company of Wales to base a considerable expansion of output on continuous casting.

HISTORY OF THE RESEARCH PROJECT

BISRA first became actively engaged in research into continuous casting in 1947, when casting experiments were started by the Physics Department at the BISRA London laboratories. The work at this stage was small scale, the cast sections being up to 3 in. dia. and only a few feet in length, and was concerned primarily with the fundamentals of the process. It enabled the factors governing heat transfer to the mould and the rate of solidification of the steel in the mould to become well understood and, in particular, the underlying principles of mould movement were first formulated. Much of this work has been published by Savage *et al.*[1]

In 1954 the work was transferred to the Steelmaking Division and a large-scale pilot plant was built in the BISRA laboratories in Sheffield. This plant, which came into operation in 1955, has been described by Fenton and Pearson[2]. In its original form, served by the ¼-ton arc furnace, it was capable of casting an ingot 22 ft. long, and has been used mainly for carbon and low-alloy steels. Extensive research has been carried out on the suspension and movement of the mould and on the effects of secondary cooling. In 1959 the capacity of the furnace was increased to 1 ton and the plant was modified to allow longer casting times. The lift withdrawal system was replaced by roll withdrawal, and a bending device was installed to deliver the ingot from the plant horizontally.

In 1956, BISRA and CNRM reached agreement for the interchange of technical information on continuous casting. Since 1952, CNRM had been studying[3] the possibilities of applying continuous casting to the industrial production of low-carbon or low-alloy converter or arc furnace steels and, in particular, to rimming steels, and had decided to construct an experimental machine for casting such steels at the Aciéries et Minières de la Sambre at Monceau-sur-Sambre. During this period, the transfer and controlled pouring of steel was investigated in the steelworks, using different types of ladles and tundishes with conventional ingot moulds.

In 1957, the CNRM experimental installation, which has been described by Zaeytydt[4], was commissioned. It has been used for casting 3-in., 4-in., and 8-in. sq. ingots of converter steel and has two independent casting lines equipped with moulds of the BISRA-CNRM type. Close collaboration has been maintained between the two research organizations, and a member of BISRA staff has taken part in the work on the CNRM machine.

Due to the increasing interest in continuous casting of large slabs, a second unit was constructed by BISRA in 1959 as a slab machine, but because of the restricted furnace capacity in the labora-

tories the largest section which could be contemplated was 24 by 4 in. Although this limitation had to be accepted at the time, it was desirable to cast larger sections, and early in 1960 advantage was taken of facilities offered by the Steel Company of Wales to rebuild the machine in the converter shop of the Abbey Works. The plant has now been recommissioned in its new location and is initially casting 24 by 4-in. and 27 by 5-in. slabs in low carbon converter steel. It is anticipated that the size range of the machine will be extended in the near future.

In 1959, CNRM also began design studies related to the continuous casting of heavy slabs. These studies are now at an advanced stage.

At the present moment, therefore, BISRA and CNRM are operating three experimental continuous casting machines: the pilot machine at the BISRA laboratories in Sheffield, the slab machine at the Steel Company of Wales, and the twin-strand unit at Aciéries et Minières de la Sambre.

Review of Research Results

While continuous casting of non-ferrous metals has been carried out on a commercial scale for many years, the application of the process to the casting of steel has been delayed pending the solution of several problems. Of these the difficulty of pouring steel at uniform and relatively low rates, and the problems of rupture of the newly formed ingot skin in the mould and of secondary cooling of the ingot beneath the mould, have constituted major obstacles.

It is on these problems and their associated fundamental aspects that BISRA has conducted its research, while CNRM, without, however neglecting fundamental research, has concentrated more upon the industrial development of the process.

It is, of course, of vital importance in continuous casting to provide a steady and controllable supply of liquid metal to the mould. The variable and often unpredictable flow of metal from a ladle makes it essential to use a tundish between the ladle and mould so that a smooth, uniform stream can be obtained. This provision is of vital importance when casting small sections, and an early development at BISRA was the "anti-swirl" tundish nozzle[5] in which the turbulence of the stream is minimized by channels across the top of the nozzle (see Fig. 1).

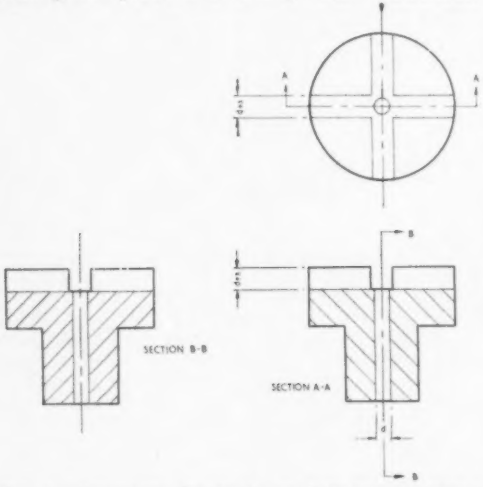

FIG. 1.—SCHEMATIC DIAGRAM OF ANTI-SWIRL NOZZLE.

Another early development, again particularly designed for small sections and relatively low flow rates, was the "heated-nozzle" tundish[2, 6] in which the nozzle is held below the main tundish hearth in a downtube which extends through a separate external heating chamber. This allows not only intense preheating, but also the maintenance of this heating throughout the cast.

The working conditions of ladles and tundishes have been the subject of a great deal of research at CNRM. Arrangements for preventing freezing of the steel round the stopper and in the nozzle, particularly at the start of casting, have been developed and have made it possible, where necessary, to cast at low rates and through the nozzles of small diameter.

Baffles and heat reflectors[7, 8] have been used to reduce the risk of steel solidifying round the exit of the nozzle which could cause "wandering" of the metal stream. The external heating of nozzles during casting, to above 1,500 deg. C. if necessary, has been made possible by the development of nozzle assemblies in materials of shape and quality which guarantee a good fit of the joints and a good performance at the high temperatures in the heating chamber. These high temperatures have been obtained by heating with gas or with a flexible and efficient electrical system developed at CNRM.

Both BISRA and CNRM normally use stoppers in the tundishes, and the danger of the stopper rod softening during pre-heating has been avoided very effectively at CNRM by the application of air-cooling to the rod.

Cheap and simple tundish constructions are possible when dealing with the higher casting rates such as are met in the production of slab and bloom sections.

Moulds

Having assured a uniform delivery of metal to the mould, it is necessary to initiate freezing in such a manner that the partially solidified ingot may safely be withdrawn at a rate matching the pouring rate. Here the design of the mould and its cooling system, mould lubrication, and the mould action are of very great importance.

(*a*) *Flexibly Mounted Moulds.*—The early work at the BISRA London laboratories provided a sound knowledge of the principles governing heat transfer in the mould and of the rate of solidification of the ingot. Probably the most important fact to emerge from this work was the basic importance of the suspension and movement of the mould in overcoming the serious effects of skin rupture in

the mould, a phenomenon which is more prone to occur with fixed moulds.

It was during this early work that the resilient mounting[9] was first developed and tested in the form of the spring-mounted mould, which has been described previously.[1, 2] Briefly, if the mould is mounted on springs any friction between the mould and the newly-formed ingot skin tends to pull the mould downwards so that the force acting on the skin is only the restoring force of the springs. As the mould moves downwards the restoring force increases gradually; at the same time the skin is being rapidly chilled, thickened, and strengthened, and is tending to shrink away from the mould so that friction decreases and the mould returns to its normal position. The springs used must be carefully chosen, of course, so that at no time does the restoring force exceed the breaking strength of the skin.

This type of mould has been extensively tested on the BISRA plant in Sheffield and on the CNRM plant at Charleroi. On the latter plant only one spring is used[10] and a damper arrangement is fitted to absorb any shock when the mould returns to its topmost position. The spring-mounted mould has the advantage of being a completely independent unit, and probably its greatest asset is its simplicity. Surface quality is excellent, as has been demonstrated by the 3-in. and 4-in. sq. ingots produced by BISRA and the 8-in. sq. ingots by CNRM (see Fig. 2).

(*b*) *Compression-release Reciprocating Moulds.*—The spring-mounted mould has been found to be a simple and effective means of preventing skin rupture in the mould at relatively low casting speeds. At higher speeds, although extensive tests have not been carried out, there are indications that this type is not sufficiently reliable for commercial application, and a good deal of research has been carried out to develop other systems with particular regard to obtaining complete reliability, especially at higher casting speeds. This led to the development of the principle which has become known as "compression-release"[11]; the name is derived from the basic idea that adhesion between mould and ingot should be released by a means which will result in longitudinally compressive, rather than tensile, forces in the ingot skin. This entails relative movement between mould and ingot in the direction *opposite* to that of normal ingot withdrawal.

With the continuously reciprocating mould, "compression-release" is applied in each cycle; on the downstroke the mould is moved slightly faster than the ingot, instead of at the same speed as in the Junghans-Rossi cycle. Because relative movement between the ingot and mould is maintained throughout the downstroke, the possibility of sticking is prevented and, therefore, there is less chance of rupture occurring on the return upstroke.

The use of "compression-release" continuous reciprocation by BISRA has already been described by Fenton[12]. With 3-in. sq. ingots casting speeds of 4 m./min. (13 ft./min.) were achieved without difficulty and with no indication that the maximum permissible speed had been reached. This casting rate has, in fact, been easily exceeded on the CNRM plant at Charleroi, where 3-in. sq. ingots have been cast at 5 m./min. (16 ft./min.) and 4-in. sq. ingots at 3 m./min. (10 ft./min.).

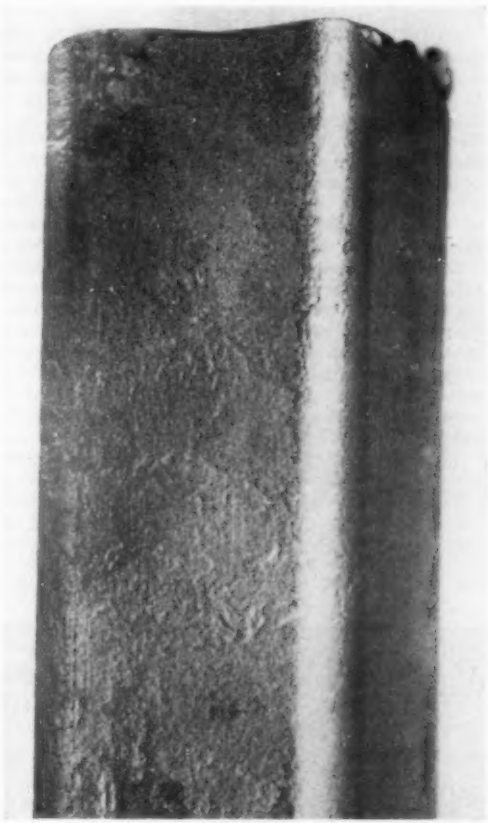

FIG. 2.—TYPICAL INGOT SURFACE PRODUCED BY A SPRING-MOUNTED MOULD.

"Compression-release" can be applied to any of the three most widely used mould systems. With spring-mounting the system is arranged so that during operation the mould is capable of acting as a normal spring-mounted mould; but should excessive friction compress the springs beyond a certain predetermined distance the mould is given a rapid impulse downwards to release the friction. It returns then to its top position where once more it behaves as a normal spring-mounted mould, until the next period of high friction.

With both spring-mounting and continuous oscillation it has been found most convenient to apply "compression-release" by hydraulic means and such systems have been developed jointly by

CNRM, BISRA, and the Continuous Casting Company.

Early in its research programme, CNRM also studied means of withdrawing the ingot without tearing the skin, with the object of improving surface quality. The suspension system using a single spring and shock absorber[10] has been mentioned previously, and reciprocating moulds have also been studied in order to obtain improved cycles of oscillation. Methods have been devised by CNRM for measuring the difference in speed of the ingot and the mould and to give directly the degree of "slip" of the mould over the ingot.

Whatever type of mould system is used efficient lubrication is necessary to reduce friction between ingot and mould. This problem was the subject of much early research, using a flexibly-mounted mould to compare the effects of different lubricants. The one most commonly used by BISRA and CNRM is rape seed oil, applied by means of a detachable oil ring[13] which is seated around the top periphery of the mould.

The design of the mould itself has been given considerable attention, both at BISRA and at CNRM. For smaller sections (up to 4 in.) both organizations have found it most convenient to use one-piece drawn or extruded copper tubes. For larger sections "built-up" moulds are used; for instance, the 8-in. sq. mould at CNRM has four separate detachable walls, each consisting of a copper plate bolted to a heavy steel backing plate in which the cooling water channels are cut.

FIG. 3.—BENDING DURING CONTINUOUS CASTING AT CNRM.

For optimum thermal efficiency of the mould, whatever the type, high-velocity turbulent water flow (30 ft./sec. or more) is desirable in the water-cooling channels.

In this connection the water inlet and outlet manifolds, designed by CNRM to reduce pressure losses on entry into and exit from the annulus, have proved particularly useful.

In order to increase plant availability, CNRM and BISRA have developed several methods of attaching and detaching the dummy-bar and the dummy-head. When casting 3-in. and 4-in. sq. sections the ingots are bent beneath the withdrawal rolls and removed from the plant horizontally (see Fig. 3). It has been found advantageous to detach the one-piece dummy-bar automatically and to push it sideways after the head has passed the withdrawal rolls. The dummy-bar is thus ready to be replaced when the cast has ended. The bending of the ingot is achieved automatically by simple and robust methods.

Secondary Cooling and Steel Quality

Below the mould it is often desirable to accelerate the freezing of the ingot (compared with the rate obtained only by radiation loss) by the application of secondary cooling in the form of water sprays. Strict control of this operation is essential; too severe cooling can easily cause metallurgical damage to the ingot structure, while too little water spraying will lead to an undesirably deep liquid core. As it is the depth of liquid core which largely determines the necessary height of a casting machine it is obvious that the permissible limits of secondary cooling are prime factors in plant design.

A method for the determination of these limits has been described by Fenton[12]. A small static ingot of the desired section is cast into a split mould, and the mould is then removed after a predetermined time and the ingot sprayed with water, the rates and duration again being predetermined. Thermocouples within the ingot indicate the course of solidification, and the ingot is subsequently sectioned to determine the effect of the secondary cooling on ingot structure. It has been shown that the optimum secondary cooling conditions for any grade of steel can be determined simply and quickly by this method.

The quality of the product has received a good deal of attention throughout this work. As previously mentioned, the work at Sheffield laboratories has been largely concerned with carbon and low alloy steels, while CNRM has been concerned with low-carbon rimming and killed steels.

At BISRA many ingots have been rolled to different bar sizes and subjected to mechanical tests, and in all cases the relevant British Standard specification has been achieved. The required amount of reduction in area during rolling varies with the type of steel; with some specifications a 50 per cent. reduction is adequate while with other more

rigid specifications 85 per cent. reduction is necessary.

CNRM has tackled and resolved the casting of low-carbon Thomas steel in killed and rimming qualities. Continuous casting necessarily demands more precise temperature control than conventional casting into ingot moulds, and at CNRM investigations have been made of the liquid steel temperatures required in the converter, ladle, and tundish. These temperature requirements are now well established for successful casting[14]. The control of rimming in the mould and the distribution of blowholes have been the subject of much research, and successful methods have been developed for the control of deoxidation and rim structure.

In the study of continuous casting equipment, CNRM and BISRA have always followed the accepted principle that, in iron and steel making, simple, yet robust, designs are the best and the research has confirmed this principle. Without doubt, the experience gained at CNRM and BISRA will prove to be of great value in the operation of future continuous casting installations.

Acknowledgments

Although this review has been prepared by the staff of the Steelmaking Division of BISRA and the Continuous Casting Section of CNRM, the developments reported have been made possible only as a result of the combined efforts and assistance of many people. Patents which have been referred to represent a pool to which very major contributions have been made by the BISRA Physics Department and the Continuous Casting Company, in addition to CNRM and the Steelmaking Division of BISRA.

In addition to those mentioned in the text or in the references, the authors acknowledge particularly the invaluable assistance in the past of Mr. J. R. Rippon, now with Brymbo Steelworks, Limited, Mr. R. Mayorcas, now with John Summers & Sons, Limited, and Mr. W. Lejeune and E. Lermusiaux, of the Continuous Casting Section of CNRM.

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[13] British Patent No. 794,255.
[14] J. Zaeytydt: Journées d'Automne de la Ste. Française de Met., Paris, 1959.

[It is to be noted that patents and patent applications corresponding to the above-mentioned British and Belgian patents and patent applications have been granted or filed in most European countries and in the USA, Canada, and Japan.]

New Blast-Furnace Practices

RECENT years have shown that iron production can be substantially increased by modifications to existing plant and practice and this trend will continue to make a significant contribution to the country's growing iron requirements.

The blast-furnace plant of the Steel Company of Wales, Limited, is a good example of this trend. Already, on its modern No. 5 furnace it employs a two-component burden of fluxed sinter and coke. It also has plans, based on thorough investigations, to use oxygen-enriched blast on three furnaces as soon as the necessary tonnage-oxygen plant can be built.

The company is currently devoting considerable effort to an investigation of the injection of oil via the tuyeres. This trial is being made on No. 1 furnace and will investigate oil-injection rates of up to 1 gal./min./tuyere. A substantial reduction in coke consumption per ton of iron produced and an increase in production rate are foreshadowed.

Yugoslavia to Make More Steel

CURRENT five-year plan (1961-65) provides for an increase in Yugoslav crude steel production from 1,400,000 tons to 2,300,000 tons, according to Handelsblatt, Düsseldorf. Other planned increases are:—Pig-iron, from 1,000,000 tons to 1,600,000 tons; heavy and medium plates, from 105,000 tons to 330,000 tons; sheets, from 104,000 tons to 150,000 tons; sections, from 510,000 tons to 640,000 tons; tube products, from 88,000 tons to 160,000 tons.

The crude steel increase is to be achieved, it is stated, mainly at the existing works, which, by rationalization and technical improvements, can expand production by 550,000 tons.

Morgan Crucible at German Industries Fair

FEATURED on the stand of the Morgan Crucible group at the German Industries Fair, to be held at Hanover from April 30 to May 9, will be three furnaces. A 500-lb. (225 kg.) aluminium capacity oil-fired basin tilting furnace, a 200-lb. (100 kg.) aluminium size crucible bale-out furnace (both manufactured under licence from Morganite Crucible, Limited, by Elino Industrie (Ofenbau, Firma Carl Hanf & Company), and a high-temperature, electrically heated, muffle furnace fitted with "Crusilite" elements (elements manufactured by Morganite Electroheat, Limited). Also on show will be "Salamander Suprex" crucibles and a range of foundry accessories.

Visitors to the stand will be able to see some of the wide range of refractories manufactured by Morgan Refractories, Limited.

MECHANIZED COAL OUTPUT IN 1960

STATISTICS of coal output from mechanized faces for the year 1960 (52 weeks ended December 31, 1960) are given in Information Bulletin 61/221, issued by the production department of the National Coal Board. The following notes indicate the basis on which the statistics in Tables 1 and 2 are derived and the manner in which they have been evaluated. All the figures are based on pithead tonnages, as distinct from saleable tonnage.

Table 1 gives a summary of mechanized coal-face output by the various types of machine in use in both "longwall" and "other methods" of working during 1960, and comparative figures are also given for 1959.

The term "mechanized output" includes the coal produced by all coal-face machinery which either loads prepared coal or cuts and loads coal simultaneously. It also includes all coal obtained (including that filled by hand) where an armoured

TABLE 1.—*Summary of Mechanized Coal-face Output.*

Type of machine.	No. of machines in use at end of period.		Pithead coal loaded during period.		Pithead manshifts per thousand tons (MST) (face) incl. shotfirers.		Average advance per 24 hr.		Average advance per machine shift.	
	1960.	1959.	1960.	1959.	1960.	1959.	1960.	1959.	1960.	1959.
			Tons.	Tons.			Ft. in.	Ft. in.	Ft. in.	Ft. in.
Longwall Methods.										
1. Anderton shearer loader	326	331	29,872,883	27,570,632	143	145	4 4	4 4	2 8	2 9
2. A.B. Trepanner	175	116	15,105,143	10,183,469	125	132	5 0	4 11	2 9	2 9
3. Meco-Moore	102	104	9,501,426	9,470,141	140	144	4 8	4 6	2 10	2 9
4. *Plough Types:*										
A. Plough, rapid	142	82	6,696,303	3,983,186	181	184	3 7	3 6	2 10	3 0
B. Huwood slicer	32	23	2,645,339	2,086,181	141	157	4 0	3 5	2 3	2 0
C. Scraper box	23	21	493,914	467,051	281	268	3 4	3 6	3 0	3 3
D. Plough, slow	4	6	298,943	414,264	218	218	3 2	2 11	2 7	2 5
E. M. & C. stripper	3	3	276,618	490,243	110	120	4 9	4 9	4 9	3 7
Totals (4A to 4E)	204	135	10,411,117	7,440,925	175	179	—	—	—	—
5. *Cutter-chain Loading*[1]*:*										
(i) Conventional conveying	102	122	3,887,069	3,948,561	227	222	3 11	3 10	3 6	3 6
(ii) A.F. Conveying	10	15	785,285	1,320,883	183	200	3 2	2 10	2 7	2 2
Totals (5 (i) and 5 (ii))	112	137	4,672,354	5,269,444	219	217	3 10	3 8	3 5	3 3
6. A.F. Conveyor (with prop-free front)[2]	53	59	3,777,018	3,796,089	206	210	—	—	—	—
7. Huwood hydraulic loader[3]	51	59	2,418,476	1,811,512	180	179	3 11	3 9	3 3	3 4
8. Multi-jib cutter loader	38	42	768,047	805,736	251	232	3 10	3 10	3 3	3 4
9. Dosco miner	10	8	906,284	1,086,007	99	109	4 7	4 9	4 1	4 0
10. Gloster Getter	9	11	585,905	782,693	167	155	3 10	4 1	2 1	2 2
11. Mawco cutter loader	10	2	366,406	54,293	140	126	5 0	8 0	2 9	4 2
12. Dranyam cutter loader[4]	3	—	189,734	—	140	—	3 7	—	2 2	—
13. Trepan shearer[4]	1	—	92,398	—	122	—	3 10	—	2 4	—
14. Huwood mechanical loader[5]	5	3	248,454	146,057	171	185	4 7	4 6	4 0	3 7
15. Experimental and other applications	24	20	684,686	1,138,642	206	158	3 9	4 3	2 9	2 11
16. Totals longwall method[6] (1 to 15)	1,123	1,007	79,600,331	69,555,640	153	157	4 3	4 2	2 10	2 10
Other Methods (incl. Room and Pillar)										
17. Gathering-arm loaders	73	61	1,817,081	1,813,504	101	98	—	—	—	—
18. Joy continuous miner	33	27	1,249,397	935,716	51	47	—	—	—	—
19. Cutter-chain loading	17	8	191,991	117,425	120	97	—	—	—	—
20. Duckbill	13	12	89,312	134,874	194	189	—	—	—	—
21. Experimental and other applications	6	4	81,727	44,122	169	92	—	—	—	—
22. Totals, other methods (17 to 21)	142	112	3,429,508	3,045,641	88	86	—	—	—	—
Totals, longwall and other methods (items 16 and 21)	1,265	1,119	83,029,839	72,601,281	151	154	—	—	—	—

[1] Cutter-chain loading with or without flights includes any adaptation such as Lambton flights where a coal-cutter jib is modified for the purpose of loading.

[2] These figures exclude power-loaded coal. Armoured flexible conveyors (used in conjunction with power loaders) which numbered 753 at the end of the year 1960, conveyed an additional 59,778,392 tons.

[3] Formally known as Huwood Ski-Hi.

[4] The results for Dranyam cutter loaders and Trepan shearers in regard to 1959 are included in "Experimental and other applications" (item 15).

[5] Formally known as Huwood loader.

[6] The figures given as average advance per day and per shift exclude armoured flexible conveyors on a prop-free front (*i.e.*, item 6).

TABLE 2.—*Additional Details for Longwall Loaders.*

Type of machine.	Average output per 24 hr.	Average output per machine shift.	Average length of face per project.	Average area extracted.		W'ghted average seam thickness extracted.	Average output per 24 hr.	Average output per machine shift.	Average length of face per project.	Average area extracted		W'ghted average seam thickness extracted.
				Per machine shift.	Per man-shift.					Per machine shift.	Per man-shift.	
	1960.	1960.	1960.	1960.	1960.	1960.	1959.	1959.	1959.	1959.	1959.	1959.
	Tons.	Tons.	Yd.	Sq. ft.	Sq. ft.	Ft. in.	Tons.	Tons.	Yd.	Sq. ft.	Sq. ft.	Ft. in.
Anderton shearer loader ..	398	242	188	1,518	44	4 4	387	244	185	1,546	44	4 4
A.B. trepanner	459	251	215	1,771	56	3 10	438	245	211	1,723	53	3 9
Meco-Moore	388	234	167	1,341	41	4 9	382	232	175	1,302	39	4 10
Plough, rapid	272	219	164	1,438	36	4 0	273	238	164	1,567	36	4 3
Huwood slicer	448	254	197	1,244	35	5 8	398	235	195	1,123	31	5 7
Scraper box	89	80	101	900	40	2 7	108	101	107	1,080	40	2 10
Plough, slow	259	209	164	1,251	27	5 6	231	196	172	1,297	30	4 7
M & C stripper ..	384	381	157	2,264	54	4 4	430	324	187	1,906	49	4 6
Cutter-chain Loading:												
(i) Conventional conveying	157	140	128	1,299	41	3 3	142	128	117	1,191	42	3 0
(ii) A.F. conveying ..	267	218	158	1,291	32	4 8	244	184	161	1,184	32	4 10
Totals (i and ii) ..	169	149	131	1,298	40	3 6	158	138	124	1,190	40	3 6
Huwood hydraulic loader[1]	164	138	129	1,181	48	3 5	168	147	126	1,280	49	3 2
Multi-jib cutter loader ..	93	79	123	1,032	52	2 3	104	92	127	1,160	52	2 8
Dosco miner	484	425	145	1,776	42	6 3	484	408	145	1,755	39	6 2
Gloster Getter	244	132	156	953	43	3 9	262	136	158	1,026	49	3 9
Mawco cutter loader ..	343	190	169	1,435	54	3 6	431	223	143	1,702	60	3 7
Dranyam cutter loader[2] ..	392	239	192	1,287	38	5 5	—	—	—	—	—	—
Trepan shearer[2]	343	210	203	1,568	61	3 9	—	—	—	—	—	—
Huwood mechanical loader[3]	169	148	211	1,588	63	2 8	161	128	187	1,289	54	3 0
Experimental and other applications	203	149	151	1,235	40	4 1	287	194	166	1,311	43	4 4
Great Britain, average ..	327	218	171	1,455	44	4 2	316	216	166	1,438	43	4 3

[1] Formally known as Huwood Ski-Hi.
[2] The results of Dranyam cutter loaders and Trepan shearers for 1959 are included in "Experimental and other applications."
[3] Formally known as Huwood loader.

flexible conveyor is in use without a separate power loader and where, at the completion of the shift or cycle, there are no props between the conveyor and the face (*i.e.*, where an armoured flexible conveyor is used on a prop-free front).

TYPE OF MACHINE.—Machines are listed in two groups, namely for "longwall" and "other methods" (the latter including room and pillar) and a grand total is given for all types of mechanized working. In each group the machines are listed in descending order of output won during the year.

NUMBER OF MACHINES IN USE.—This refers to the number of machines in use at the end of the period.

PITHEAD COAL LOADED.—This is the tonnage won by each class of machine on a pithead basis (*i.e.*, before preparation for the market).

PITHEAD MANSHIFTS PER THOUSAND TONS (MST FACE).—This is the number of manshifts worked at the face for the production of each thousand tons of pithead output.

AVERAGE ADVANCE PER 24 HR. AND PER MACHINE SHIFT.—These figures are derived by dividing the total advance during the year by the total number of days worked and by the total number of machine shifts worked, respectively. The figures exclude tonnage obtained by armoured flexible conveyors operated on a prop-free front without the use of a separate power loader.

Table 2 gives some additional statistical details for each class of longwall power loader, taking the machines in use at any time during the period; comparable figures are also given for the year 1959.

AVERAGE OUTPUT PER 24 HR. AND PER MACHINE SHIFT.—These figures are derived by dividing the total output by the total number of days worked and by the total number of shifts worked respectively. (In many cases, machines work more than one shift per day.)

AVERAGE LENGTH OF FACE PER PROJECT.—The average length of face is derived by dividing the total length of all faces which were worked (including stable holes) during the year by the total number of projects at work during the year.

AVERAGE AREA EXTRACTED PER MACHINE SHIFT AND PER MANSHIFT.—These figures are calculated by multiplying the length of faces, including stable holes, by the advance of each individual project, adding the results and dividing by the total number of machine shifts and by the total manshifts worked, respectively.

WEIGHTED AVERAGE SEAM THICKNESS EXTRACTED.—This is derived by multiplying the tonnage by the seam thickness for each project, adding the results and then dividing by the total output.

WEST GERMAN crude steel output in February is returned at 2,787,190 tons, against 2,969,647 tons in January. The daily average, however, rose to 105,177 tons, compared with 104,198 tons, the number of days worked being only 26.5 (28.5). Pig-iron production was 2,051,633 (2,206,589), tons, corresponding to a daily output of 73,274 (71,180) tons, the number of days worked being 28 (31).

PHILATELY AND THE IRON AND STEEL INDUSTRY

Blast Furnaces

By H. HOCKE

BLAST furnaces are no longer the smoking stacks of a century ago, but are now tall structures, which, at least in the eyes of their operators, are still the most important pieces of plant in an integrated steelworks because it is there that the iron is made. Some efforts have been made to produce iron by direct electrical reduction methods. The process is hardly a commercial proposition at the moment, so that the ironmakers still have to rely on the basic principles of the blast furnace.

The blast furnace is probably the piece of equipment that has been shown most often on postage stamps; in fact, many countries have at least one stamp showing such a furnace.

Austria (March, 1947) shows a modern furnace on a red 35 gr. stamp, issued on the occasion of the Vienna Fair. The 6.30 fr. bright purple stamp of Belgium (industrial series, 1948) illustrates a blast furnace with a most unusual skip hoist. Bulgaria (September, 1959) and Brazil (1941) have at least one stamp with a blast furnace on it.

FIVE CENT COLOMBIA STAMP SHOWING A BLAST FURNACE AT PAZ DEL RIO.

China sports several stamps with blast furnaces, ancient and modern, including a recent sample showing one of the "backyard furnaces." Czechoslovakia also has a regular output of postage stamps with steelworks aspects, starting with blast-furnace construction and furnace tapping (February, 1952) and progressing to a stamp where the schematic line drawing of furnace and stoves is so small as to be seen with difficulty at a first glance (May, 1958). The last stamp with a blast furnace was issued in July last year, but doubtless there will be more. Hungary has issued two stamps with blast furnaces as the major design (1950 and April, 1955).

On the occasion of the centenary of the Japanese iron industry, Japan issued a stamp showing both a modern furnace and one of the furnaces of 100 years ago. The latter showed water-driven bellows and was charged from the top by hand (December, 1957). The blast furnace at Hwang Hai steelworks is shown on a stamp of North Korea (November, 1954), as are also line drawings of furnace and stoves as background on stamps issued on the occasion of the Production Executives Meeting in September, 1958.

Poland and Russia have both issued many stamps with blast furnaces and it is rather interesting to note that they usually show four Cowper stoves per furnace, compared with the usual British three-stove practice. At least two countries, Rumania (April, 1950) and Russia (October, 1929), are not satisfied with showing the furnace only, but also illustrate pictorially, by means of a graph, the annual output of pig-iron. Stamps come in all shapes and sizes and Rumania has the distinction of having issued the only triangular imperforate stamp with a blast furnace. It is an air stamp issued on the occasion of the 16th Congress of Rumanian Engineers (November, 1945). A country which recently joined the many showing blast furnaces is North Viet Nam. It shows women of Viet Nam, with blast furnaces and stoves in the background (February, 1960).

This is by no means a complete list of the many countries having issued stamps with a blast furnace—this would be beyond the scope of a short article. There are many stamps, for instance, where the furnace plays a minor part, either in the background or as a line drawing or on a stamp illustrating a complete steelworks.

SIERRA GRANDE IRON-ORE DEPOSITS

DEVELOPMENT of Sierra Grande iron-ore deposits in Patagonia by a German-Argentine consortium, Misipa, has now been commenced, according to a report in l'Echo de la Bourse, Brussels. The first stage of development includes exploration of the deposits and examination of the most suitable method of smelting the ore. In the second stage mining will be started and, ultimately, an iron and steel works will be built in Patagonia with an annual output of at least 100,000 tons.

Proved reserves of ore are reported to be 70,000,000 tons and probable reserves 200,000,000 tons. It is estimated that the cost of the ore delivered to the San Nicolas works would be about $8 per ton, compared with the present cost of $13 to $14 for imported ores.

REGISTRATIONS for the Second International Conference on Materials Handling, to be held at Southport from May 10 to 12, are reported to be very encouraging. The list of speakers is now complete and this, together with all other information connected with the conference, may be obtained from the Institute of Materials Handling, 32, Watling Street, London, E.C.4.

Home Ore Preparation at Corby

by D. PARKINSON*

AMONG the many achievements by Stewarts and Lloyds, Limited, at its Corby works, one appears to have passed unnoticed. The company is able to prepare the sticky Northants ore, as received, to a product of $\frac{3}{4}$ in. to $1\frac{1}{2}$ in. for the blast furnaces and to $-\frac{3}{8}$ in. for the sinter plant without recourse to drying.

Up to the tertiary crushing and screening house, the plant is conventional—although special attention has, of course, been given to the problems associated with wet ore. At Corby, the moisture content normally averages 13 per cent. and, during the winter months, is often as high as 21 per cent.

The ore is primary-crushed to 8 in. in Hadfields 6-ft. E-type rolls and secondary-crushed in two 5-ft. Symons cone crushers set at $2\frac{1}{2}$ in., after which it passed to the ore bedding yard. Ore with up to $2\frac{1}{2}$-in. by 8-in. by 8-in. slabs is reclaimed at rates to suit the blast-furnace and sinter plant requirements whence it passes to the tertiary crushing and screening house.

It should be pointed out that the clay content of the ore at the high moisture content experienced makes crushing progressively more difficult at each stage, so that during tertiary crushing, serious problems have had to be overcome. The general layout of the tertiary crusher screen house is shown in Fig. 1.

Primary screening "A" is designed to remove natural $-\frac{3}{8}$-in. ore for sintering and to select the required small lump sizes for the blast furnaces, leaving the $+\frac{3}{8}$-in. middles and $1\frac{1}{4}$-in. oversize, particularly the large slabby material (which is unsuitable for the blast furnaces) for tertiary crushing. The screens are so arranged that all $+\frac{3}{8}$ in. can, if necessary, pass to the tertiary crushers to satisfy maximum sinter plant requirements.

The product from the tertiary crushers is screened at "B" to eliminate $+\frac{3}{8}$ in. from the sinter plant supply. Oversize $+\frac{3}{8}$ in. passes either to the blast-furnace stockyard or is returned to the reclaimed ore stream, so that the tertiary crushers are operated in closed circuit when maximum $-\frac{3}{8}$ in. for sintering is required. Alternatively, the crushers can be set to "rough crush" to produce a maximum $+\frac{3}{8}$ in. to meet peak small lump ore demands.

The tertiary crushers (Fig. 2) consist of three B.J-D 42-in. by 50-in. reversible Mud Hogs, manufactured by British Jeffrey-Diamond, Limited. The principle of these machines is that there is a central rotor, on which the hammers swing freely, and two moving breakerplates arranged in V formation, one on each side of the rotor. Either is operational at will. Ore is directed to a selected side of the machine, the motor driving the rotor in the direction required, and a small independent motor driving the appropriate breakerplate, so that the ore is fed to the hammers and kept moving towards the discharge after reduction (Fig. 3).

The rotor is carried on SKF DRSA roller bearings in a sump lubricated housing of B.J-D design, catering for the arduous conditions for this application. Lubrication is controlled by a patent "Denco" lubricator, with an oil reservoir for constant level operation. Each breakerplate is made up of a series of manganese steel links, interconnected to make a continuous plate, the unit being driven by a gear-reduced motor through a chain drive.

Of the three Mud Hogs at the Corby plant, two

* Sales development engineer, British Jeffrey-Diamond, Limited.

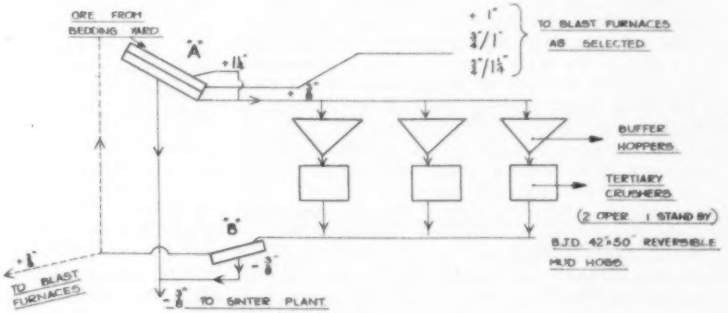

FIG. 1.—GENERAL LAYOUT OF TERTIARY CRUSHER SCREEN HOUSE AT CORBY.

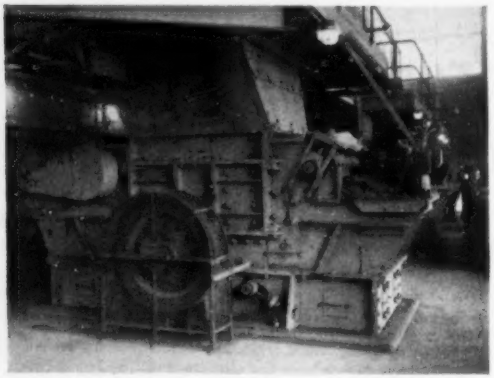

FIG. 2.—THE THREE B.J-D MUD HOGS INSTALLED IN THE STEWARTS AND LLOYDS' ORE PREPARATION PLANT.

are operational and one a standby. Each machine is directly coupled to a 400-h.p. 960-r.p.m. motor driving through a Vulcan fluid coupling, and rated at 200 tons an hour when reducing $+\frac{3}{8}$ in. to $-\frac{3}{8}$ in. The practical throughput under Corby operating conditions is 180 tons an hour, which gives 160 tons an hour of $-\frac{3}{8}$-in. material. The author believes that there are no other crushers operating continuously under such difficult conditions.

high silica ore (10 to 12 per cent. SiO_2), but a consistent 75 per cent. passing $\frac{3}{8}$ in. can be maintained throughout a hammer life of 18,000 tons, which represents a crushing cost of under 1d. a ton at all capacities up to 200 tons, irrespective of water content.

When coarse crushing, to meet maximum lump ore demands, the clearance between breakerplate and hammers is increased to about 2 in. Under these conditions hammer life is 40,000 to 50,000 tons, representing a crushing cost of less than $\frac{1}{2}$d. a ton.

During the early operational experience, feeding problems were experienced, due to th build-up of material on the machines' deflector plates, which were intended to direct the incoming ore to suit the breakerplate in use. Since these were removed, delays due to build-up have been considerably reduced.

The question of hammer material was also fully investigated. Various types of headed hammers and numerous tipping materials were tried and eventually a special hammer of heat-treated 0.45 per cent. carbon steel, weighing 33 lb., was developed. This hammer is now standard (Fig. 4). It has completely eliminated the use of tipped hammers which require specialist equipment and labour.

Maintenance is now limited to oiling and greasing every 24 hr. Two one-hour shutdowns per shift permit the removal of built-up ore from the

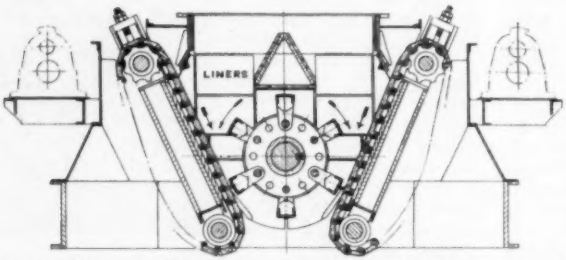

FIG. 3.—SECTIONAL DRAWING OF REVERSIBLE MUD HOG. MATERIAL CAN BE FED TO EITHER SIDE OF THE MACHINE TO UTILIZE BOTH CORNERS OF HAMMERS.

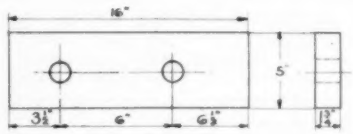

FIG. 4.—SPECIAL 33-LB. UNTIPPED HAMMER.

To understand fully the nature of crusher operations at Corby, two points should be borne in mind. Firstly, the undried Northants ore is extremely sticky due to the high moisture and clay contents, and therefore the use of screen bars in the base of the Mud Hogs, for top product size control, is precluded. Secondly, the crushers must be fully adjustable to maintain at will a balance between sinter plant and blast-furnace lump ore, which varies from 50 per cent. to 100 per cent. $-\frac{3}{8}$ in. Full advantage is therefore taken of the reversible feature and the fully adjustable breakerplates.

When fine crushing to satisfy primarily sinter plant requirements, the breakerplate is set to about $\frac{1}{2}$ in. and adjusted to compensate for wear, and the machines are frequently reversed to equalize hammer wear. This is naturally heavy on such wet, feed and discharge chutes and the crusher side liners, and periodical inspection of the hammers. This ensures that machines are reversed in time to maintain balanced wear on the operating hammer edges. Further, the hammers can be turned end-for-end to present new operating edges before excessive wear nullifies the advantages of the reversible double-end hammers.

The importance of home-produced iron ore needs no stressing and the fact that this difficult material can be successfully prepared without costly drying is due to the co-operative development efforts of engineers of Stewarts and Lloyds and British Jeffrey-Diamond.

The author wishes to thank Mr. A. H. Meadley and the Stewarts and Lloyds' engineering and operating staff for the plant details mentioned in this article.

Coal Production in the US

COMPETING WITH OIL BY HIGHER PRODUCTIVITY

The US coal industry, like all producers of solid fuel, is facing severe competition from oil and natural gas. This trend in the world fuel situation probably affected America before any other country, and the steps taken to compete with oil are therefore more advanced. Mr. S. K. Majumdar reviewed the US coal industry in an article in the Golden Jubilee number of Commerce. Extracts from the article are appended.

ENERGY requirements in the US are increasing every year and during the next 20 years are expected to be twice that of present consumption. Although most of the energy will be produced from conventional fuels and hydro-electric generation, the contribution from bituminous coal is decreasing and is being replaced by oil and natural gas.

Railways are almost entirely operated by diesel engines and both domestic and industrial markets are using natural gas and oil. The railways consumed about 125,000,000 tons of coal per year prior to the war, compared with their present annual requirements of 4,000,000 tons. Export of coal has also become restricted, due primarily to excess production in western Europe.

The expanding steel and power production plants have, however, compensated these adverse trends in coal consumption. Electric utilities consumed 168,000,000 tons in 1959, compared with 156,000,000 tons in 1958 and 93,000,000 tons in 1950. Some experts think that the use of coal will return to the railways in the form of electric power until generation by nuclear techniques becomes abundant and economic.

Strip, Auger, and Underground Mines

The US is one of the largest producers of coal in the world; in 1959 the total output was estimated at 410,000,000 tons. Estimates for 1958 show the existence of 8,264 active coal mines, of which 1,646, 299, and 6,419 were strip, auger, and underground mines, respectively. About 70 per cent. of the production came from deep mines and about 30 per cent. from auger and strip mines. Some of the largest mines are producing 18,000 to 20,000 tons of coal per day.

The average thickness of overburden in strip mines was 42 ft. in 1955, and some mines were handling between 60 ft. and 70 ft. The average cost of production of strip coal is only two thirds of the cost of coal produced from underground mines. However, the price difference is declining because of increased productivity of the deep mines and the scarcity and high cost of strip mines.

About 90 per cent. of the entire production in the US comes from West Virginia, Pennsylvania, Virginia, Kentucky, Illinois, Ohio, and Indiana. In 1958, the rate of production per man per day in underground and strip mines was 11.33 and 21.54 tons, respectively. The total number of men engaged in bituminous coal mines in the same year was estimated by the US Department of Commerce to be 197,402 and the average hourly income was $3.02.

The coal industry in the US is striving to compete with other fuels by developing more economical methods of production, preparation, and transport. In 1958, the price of coal was $4.99 per ton at the pithead, whereas in 1960 it was only $5. Thus, in spite of almost doubling the basic wage rate of labourers, mounting supplies, and welfare cost, the price of coal has remained stabilized because of increased productivity due to the adoption of mechanization.

However, increased mechanization in the field of coal production has given rise to higher proportions of impurities. The refuse content of the coal varies widely from 10 to 30 per cent., and in 1958 amounted to 19.3 per cent. In spite of the expenditure on coal preparation plant, the coals of the US have, in general, easy cleaning characteristics. Hence, two products, namely, cleans and refuse, are generally obtained when they are washed. There are about 573 preparation plants in operation which clean about 63 per cent. of the total production. The capacity of the plants varies from 500 tons to 2,000 tons per hr.

RUSSIAN COAL WASHERY FOR INDIA

ONE of six industrial projects involved in an agreement between the Government of India and the Soviet Union is a washery for coking coal with a capacity of 3,000,000 tons of coal a year at Kathara in Bihar. The projects are to be financed from the long-term credit of 112,500,000 roubles (about Rs. 600,000,000) extended to India by the Russian Government.

A Soviet organization will prepare a detailed project report and working drawings for the establishment of the project, supply equipment, machinery, spare parts, and other materials, as well as render technical assistance in the establishment of the washery and putting it into operation.

ORDERS FROM CZECHOSLOVAKIA for machinery worth about £60,000 have been received by the Bronx Engineering Company, Limited, Lye (Worcs). The orders cover a press brake, a mill for making hoes, spades and shovels, a process levelling machine for processing sheet steel before deep drawing, and a large tube straightening machine.

Mining Oversea

in which we review, from time to time, interesting mining matters reported by our contemporaries abroad

GYRO-DRIVE FOR MONORAIL HAULAGE

USED for hauling mine cars or to carry suspended loads is a monorail drive unit on gyroscopic principles which has been developed by the Siberian Metallurgical Institute. Fig. 1 shows the principal of construction. The flywheel is accelerated by water under pressure, which, at 550 lb./sq. in., takes 3 min. to speed the flywheel up to 6,000 r.p.m. Where no water is available compressed air may be used.

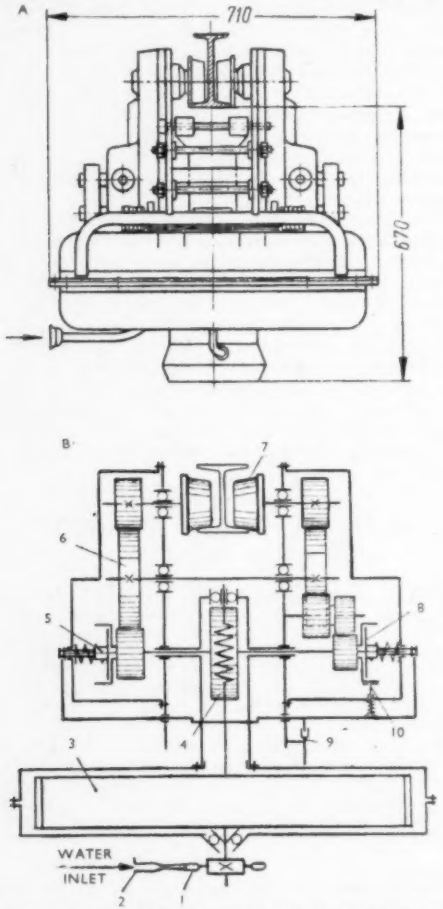

FIG. 1.—GENERAL ARRANGEMENT AND WORKING DETAILS OF THE GYRO-DRIVE.

1.—Hydraulic turbine. 2.—Nozzle. 3.—Flywheel. 4.—Worm-wheel transmission. 5 and 8.—Clutches for gear change. 6.—Train of gears. 7.—Runner wheels. 9.—Control ladle. 10.—Pawl for brake.

With a load of ½ ton, one charge enables the unit to travel 3,700 ft. on the level before recharging. The unit weighs 1,700 lb. Production of these units for the Kuznets is stated to have started.—N. V. FILATOV, Ugol, August, 1960.

METHANE DRAINAGE IN THE DONETZ

SEAMS of the Yugo-Zapadnaja Colliery No. 3 in the Donetz Trust are very gassy and in order to keep the gas emission within acceptable limits, drainage holes are drilled 66 ft. and 190 ft. into two unworkable coal seams in the roof.

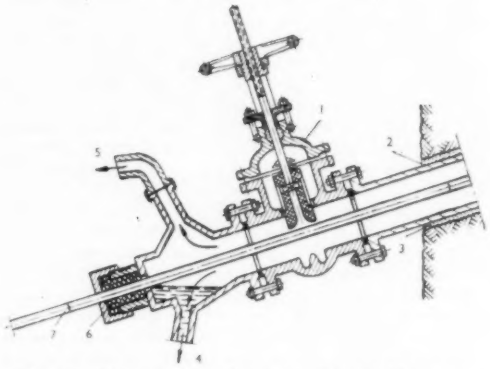

FIG. 2.—VALVE WITH STUFFING GLAND USED IN DRILLING METHANE DRAINAGE HOLES.

1.—Gate valve. 2.—Borehole mouth. 3.—Casing. 4.—Water to hydraulic seal. 5.—Gas to exhauster. 6.—Stuffing box. 7.—Drill steel.

Fig. 2 shows a fitting to enable drainage to begin while the hole is being drilled. In two seams where the methane content in the air ways before drainage was 1.5 and 3.5 per cent., the measures taken reduced it in both cases to 0.5 per cent.—N. A. DENSHTSHIKOV, Ugol, May, 1960.

MULTI-ROPE WINDING

AT the beginning of 1960 the following multi-rope winding plants were either already in service or in the planning stage:—Western Germany, 26; Great Britain, 13; France, 9; Belgium, 3, and Holland, 7. The figures refer to four-rope systems. The number of two-rope Koepe systems, either in service, in erection, or in the planning stage, in western Germany is 21, half of which have automatic control. The total number of multi-rope winding plants in the whole world, on the same basis, was 240 at the end of 1959.

The multiplicity of designs indicates that there is as yet no unanimity as to the preferred type of suspension. Present types include the complicated

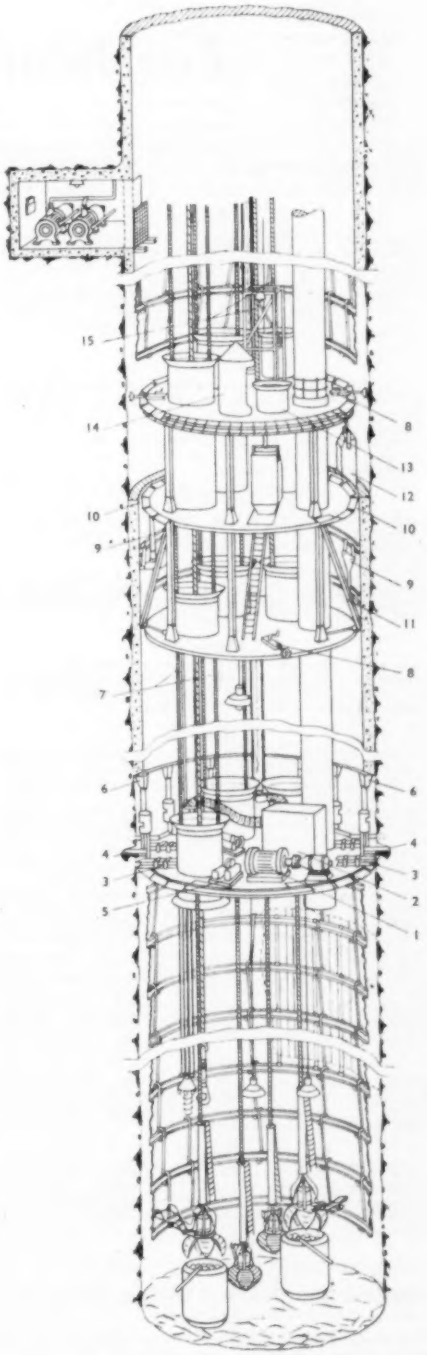

FIG. 3.—SHAFT-SINKING EQUIPMENT USED BY RUSSIAN ENGINEERS IN EAST GERMANY.

1.—Centrifugal pump. 2.—Water tank. 3.—Outriggers from I-sections. 4.—Anchorage. 5.—Winches for cactus grabs. 6.—Start of concreting section, supported by 12 steel props. 7.—Guide ropes. 8.—Centring jacks. 9.—Support for shuttering. 10.—Protection flaps. 11.—Safety outrigger. 12.—Concrete bucket. 13.—Hopper for concrete. 14.—Shelter for onsetter. 15.—Ropes for concreting stage.

triple balance beams, simpler types with C-type dynamometers and the straight-forward four-point suspension without supervisory or balancing devices. The future line of development of the winders seems to lie in fixed motor stators, with the Koepe pulley itself serving as the rotor controlled by disc brakes.—F. LANGE, Glückauf, October 22, 1960.

POWERED ROOF SUPPORT IN FRANCE

THE French Coal Board has completed two field tests with home-made powered roof supports, one in the Bruay group in the northern coalfield and one in Provence. In that area their introduction made it possible to dispense with the waste packs and had almost completely eliminated the "bumps" which used to affect the coal faces.

The roof strata cave better and in more regular pieces than before. The more even support of the roof along the waste edge was also found to result. Under the prevailing conditions, it is estimated that the cost of the powered roof support system is offset by savings in wages and supplies in 18 to 36 months. If powered roof support systems are to be successful in the widely varying conditions of other French collieries, more robust designs, which will, of course, be still more expensive, will have to be developed.—R. COEUILLET, Annales des Mines, September, 1960.

RUSSIAN SHAFT-SINKING EQUIPMENT

SHAFT-sinking equipment, designed by Russian engineers and used to sink a 25-ft. dia. shaft to a depth of 3,900 ft. in East Germany, with simultaneous concrete lining, is shown in Fig. 3. The rate of advance was slowed down by the necessity of a provisional support and by the transport of cement in kibbles. In two months was it possible to reach only a monthly rate of advance of 430 ft. and 510 ft. and it is hoped to avoid these two bottlenecks in future sinking projects.—G. CZECH, Bergbautechnik, October, 1960.

ABOUT RS. 250,000,000 is said to have been allotted by the Planning Commission of India for a steel plant in the south, which might be located at Meyveli in Madras State. Neyveli has been preferred because it is more economical to carry the iron ore there than to carry the lignite from there to some other place.

Forthcoming Events

APRIL 3

Society of Instrument Technology (South Yorkshire Section):—Annual general meeting at the University, St. George's Square, Sheffield 1, at 7 p.m., followed by "Feedback in Management Control," by M. Thomas.

APRIL 4

Institution of Plant Engineers (Peterborough Branch):—Meeting at the White Lion Hotel, Church Street, Peterborough, at 7.30 p.m. "Factory Electrical Distribution Systems," by J. H. Quick.

Institution of Electrical Engineers (South-East Scotland Subcentre):—Meeting at the Carlton Hotel, Edinburgh, at 7 p.m. "A General Theory of Depreciation of Engineering Plant," by D. Rudd.

APRIL 5

Junior Institution of Engineers (Midland Section):—Meeting at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 7 p.m. "The Words of an Engineer," by W. K. V. Gale.

Institution of Plant Engineers (Southern Branch):—Meeting at the Grand Hotel, Bournemouth, at 7.30 p.m. "Radioactive Isotopes in Industry."

APRIL 6

Midland Institute of Mining Engineers:—Meeting at the Danum Hotel, Doncaster. "Factors which Influence the Firedamp Contents of Wastes on Longwall Faces," by H. Davey.

North of England Institute of Mining and Mechanical Engineers:—Meeting at the Neville Hall, Newcastle-upon-Tyne 1, at 2.30 p.m. "The Effect of Strata Pressure on Coal Winning," by P. Hutchinson.

APRIL 7

North East Coast Institution of Engineers and Shipbuilders:—Meeting at the Mining Institute, Newcastle-upon-Tyne, at 6.15 p.m. "Oil Firing with Particular Reference to Marine Application," by G. R. Gray.

APRIL 10

Society of Engineers:—Meeting at the Geological Society, Burlington House, Piccadilly, London, W.1, at 5.30 p.m. "Use of Electric Light and Heat in Horticulture," by A. E. Canham.

Society of Instrument Technology (Manchester Section):—Meeting at the Nag's Head, Jacksons Row, Manchester, at 6.45 p.m. "Industrial Application of TV."

Institute of British Foundrymen (Sheffield Branch):—Meeting at the Technical College, Pond Street, Sheffield, at 7 p.m. "Cost Control in the Foundry," by D. A. Crooks.

Institute of Marine Engineers (West of England Section):—Meeting in the Small Engineering Lecture Theatre, University of Bristol, University Walk, Bristol 8, at 7.30 p.m. "Details and Operating Data of Recent a.c. Installations," by A. N. Savage.

Institute of Marine Engineers (Merseyside and North Western Section):—Meeting at the Liverpool Engineering Society, The Temple, Dale Street, Liverpool, at 6 p.m. "Materials for Advanced Steam Conditions and their Influence on Operation of Turbines and Boilers," by Cdr. H. E. C. Hims and S. H. Frederick.

APRIL 11

Combustion Engineering Association (Northern Region):—Meeting at the George Hotel, Huddersfield, at 2.30 p.m. Papers on "Operation and Incentive Schemes Applied to Shell Boiler Installations."

APRIL 12

Iron and Steel Institute:—Joint meeting with the Sheffield Metallurgical Association and the Sheffield Society of Engineers and Metallurgists at the Engineering Lecture Theatre, The University, St. George's Square, Sheffield 1, at 2.15 p.m.

APRIL 14

Lincolnshire Iron and Steel Institute:—Annual dinner.

National Association of Colliery Managers

APRIL 3

South Midland Branch:—Annual general meeting and presidential address at Ashby Rescue Station, at 4 p.m.

APRIL 4

South Wales Branch:—Meeting at the South Wales Institute of Engineers, Park Place, Cardiff, at 6 p.m. "Hydraulic Face Supports—Experience in No. 4 Area, East Midlands Division," by C. Round, No. 9 Area general manager South-Western Divisional Coal Board.

APRIL 5

Scottish Branch:—Meeting in the Mining Laboratories, Grassmarket, Edinburgh, at 5.15 p.m. Address by D. J. Skidmore, production director, Scottish Divisional Coal Board.

APRIL 7

Midland Branch:—Annual dinner and dance at the Sherwood Rooms, Greyfriar Gate, Nottingham.

APRIL 11

Yorkshire Branch:—Annual general meeting at the Miners' Welfare Hall, Brodsworth, at 3 p.m.

APRIL 17

Midland Branch:—Meeting at the Five Ways Hotel, Nottingham, at 6.30 p.m. Address by H. S. Stephenson, HM Divisional Inspector of Mines.

APRIL 21

Kent Branch:—Annual general meeting at the Swan Hotel, Deal, at 7.15 p.m., followed by "The Reconstruction of Snowdown Colliery," by J. L. Huxley, agent/manager, Snowdown Colliery.

APRIL 26

Lancashire Branch:—Meeting at 40, Portland Street, Manchester. "The Application of Fluid Drives in the Mining Industry," by E. C. Farrer, director, Fluidrive Engineering Company, Limited.

APRIL 27

South Staffordshire, Warwickshire, Worcestershire and Shropshire Branch:—Visit to Bretby Central Engineering Establishment.

APRIL 28

Kent Branch:—Annual dinner and dance at the County Hotel, Canterbury.

POST-GRADUATE COURSE IN WELDING TECHNOLOGY

ORGANIZATION of a post-graduate course in welding technology which the Ministry of Education has set up in response to the representations of the Institute of Welding and the British Welding Research Association at the College of Aeronautics, Cranfield, is announced by the Institute of Welding. The course will open in the autumn.

Already, the minimum enrolment to ensure the holding of the course has been secured as a result of promises from A.E.I. (Manchester), Limited, British Oxygen Company, Limited, and Whessoe, Limited. The British Oxygen Company has also promised to endow two bursaries for a period of seven years, the candidates to be selected by the institute.

In the United States and in the USSR provision for the education of welding specialists is of long standing, so that the supply of qualified men far exceeds what is available in this country. This new course is, therefore, a most important development.

Copies of the prospectus and application forms for the course may be obtained from the Warden, College of Aeronautics, Cranfield, Bletchley (Bucks).

Extracts are given below from a paper which Sir Robert Shone gave at a meeting of the Royal Society of Arts in London on Wednesday of last week. The Paymaster-General, Lord Mills, was in the chair. Sir Robert's paper was the second of two lectures on the steel industry given to the Royal Society, the first having been given by Sir Andrew McCance, chairman and managing director of Colvilles, Limited, Glasgow, and reported in our issue of March 10 (p. 525). Sir Robert, an executive member of the Iron and Steel Board, said he hoped his paper would be complementary to Sir Andrew's address on the technical development of the industry.

Economic Development of the Steel Industry

by Sir Robert Shone, CBE

ECONOMIC development is a vast and vague subject. Perhaps I can best focus it by looking at it from the standpoint of the instructions in the Iron and Steel Act, 1953, which provided for the sale of the securities of the various steel companies held by the State and set up an Iron and Steel Board, charged with a general supervision of the iron and steel industry so as to promote "the efficient, economic, and adequate supply under competitive conditions."

The powers given the board to carry out its duty are essentially economic planning powers: powers, for example, of price and development control, and these have to be used in the supervision of a competitive industry. The first economic question that arises then is whether the combination of competition and planning in steel is a satisfactory arrangement. In principle I think it is, but the test must essentially be a practical one.

Price Control

Perhaps the issue of planning intervention is brought out most sharply in the action of the board in establishing what it believes the competitive price should be rather than in relying only on market forces. The board has itself set as a maximum for the home market what it regards as the long-term competitive price. The ECSC approach on the Continent is somewhat different. There the possible dangers of at least semi-monopolistic pricing are met by elaborate non-discrimination rules so that a price charged to one customer must be extended to all. There are also reserve powers to fix maximum and minimum prices if necessary. Both the European and British systems involve intervention aimed at securing competitive prices in circumstances in which they are unlikely to occur naturally. I am inclined to think that the opposite problem of the instability of the international market will be tackled eventually by some method which involves features drawn from the present domestic policies within the two areas.

But it is not sufficient to be satisfied that a fair competitive price is established in the market. It is essential also that cost distortions be avoided and that competing firms feel the true impact of costs. Importance has therefore been attached to getting rid of schemes which might mask the true cost of production.

While the UK price of steel is essentially an administered price, though set at the competitive level, the competitive rivalry between the firms finds direct expression in their growth policies. This is no light observation, paying lip service to competition. Over the past decade steel output has increased by 50 per cent., but among the 10 largest firms the growth has ranged widely from 1 per cent. to 500 per cent. And among the smaller firms and plants there have been many that have gone out of production altogether, others that have doubled their output.

In development, just as in prices, conditions of large-scale production make the assumptions of atomistic competition entirely unrealistic. The competition is real, but the traditional market disciplines of trial and error do not alone always lend them-

selves to solutions when hundreds of millions of pounds are at stake at one time.

Price Movements

Steel prices since the war have risen by more than retail prices. There has been a large rise in the prices of steelworks' plant and also a still larger percentage increase in coal prices. The prices of the other main raw materials, imported ore and scrap, have risen by a little more than steel prices. Hourly earnings of employees have gone up in line with those of the country generally and cannot therefore be considered a special problem in relation to the steel industry.

Before looking at the efficiency of the industry itself, I must comment on the two oustanding cost increases. The first is an over five-fold increase in the price of coal. The dependence on coal—just over 1 ton of coal is used to make 1 ton of steel—largely explains why steel prices have risen by more than most competing materials. The price of timber is much less than double, aluminium and glass barely double, while the price of steel is almost three and a half times that ruling pre-war. The increase last autumn of nearly 10 per cent. in coking coal prices, after some years of stability in the relationship between British and continental coal prices, caused anxiety in the steel industry. A gap has already widened between British and American coal prices so that the price of American coal delivered to European ports is now frequently below both British and European prices. This change in the situation has greatly strengthened the competitive power of nations over-sea, many of which are well placed for using the extensive and widely distributed iron-ore resources of the world, but still depend on import of coking coal, though new techniques may increase the possibility of using oil or natural gas.

Another very important factor is the considerably greater increase in plant prices than in the general level of prices in this country. The retail price index is about two and three quarter times the pre-war level, but the plant price index is over four times pre-war. It is unsafe to rely too much on price indices, since the quality of the goods covered, and this applies particularly to the plant index, is constantly changing. Nevertheless, the disparity in movement in the two indices points to a handicap in installing new capital equipment as a means of reducing costs and saving scarce labour.

Costs at New Plant

The two cost items so far referred to relate to matters outside the industry. I now turn to costs more directly under the control of the industry itself. The best way of illustrating the significance of these items is I think to describe briefly the way in which maximum prices for steel are determined and to bring out some of the main cost components in such prices.

The board in determining maximum prices has departed from the war and early post-war systems of control, which were based essentially on average costs, to one based in the main on costs attainable by a new plant. Other factors may be taken into account, but primarily the object is to establish a price that reflects "the costs of production and reasonable capital charges at new plant, incorporating the most modern techniques, favourably situated for raw materials and markets, and operating at a high degree of efficiency" [Iron and Steel Board Annual Report, 1958]. This approach is based on the view that the competitive price is that at which it would be economic to invest in the industry, but that competitive forces would prevent the price rising significantly above this level.

To bring out the factors determining the building of new plant to replace old the same cost figures are set out in Table 1. This analyses in approximate terms the contrast between the main cost elements at a new plant used for price determination, an average existing plant, and a high cost plant.

TABLE 1.—*Costs Summary (Per Ton of Product).*

	High cost plant.	Average plant.	New plant.
	£ s. d.	£ s. d.	£ s. d.
Wages and salaries ..	8 14 0	6 13 0	4 2 0
Coal, fuel, and power ..	9 0 0	7 11 0	6 8 0
Inland transport	3 0 0	2 17 0	2 15 0
Metallic raw materials ..	10 10 0	10 10 0	10 10 0
Other costs	6 3 0	5 17 0	5 10 0
	37 7 0	33 8 0	29 5 0
Depreciation, tax, and profit	2 13 0	6 12 0	10 15 0
Realized price	40 0 0	40 0 0	40 0 0

At one end of the scale some of the plants are earning little over £2 10s. per ton towards capital charges, compared with £10 15s. assessed as necessary at the new plant and compared with £6 12s. as the average current gross earnings.

Uneconomic Plant

The minimum margin of £2 13s., shown in the table, is very close to the point at which plant becomes uneconomic. The extractable capital from a steel plant might consist of something like £12 per ton for working capital including stores, etc., or perhaps a total of £20 per ton of production when the residual value of the plant is included. Unless, therefore, a margin of about £2 a ton is secured, it would be better to transfer the extractable assets to some other line of investment, though this may not be such a straightforward issue when account is taken of the many human and other factors involved. Sometimes, too, it may be possible to modernize favourably part of the plant so that the whole continues to be viable. In this instance it does not look as though any of the plants concerned are yet quite at the point of replacement.

But in considering replacement we must look ahead for, say, five years. By then it may be expected that wages will rise in relation to prices by some 15 per cent.—on the doubling the standard of living in 25 years theory. In this event the plants at the back end of the scale are likely to be faced with wage costs that are about £1 6s. a ton higher

in relation to prices, and must be considered on this account alone as probably having crossed the borderline between being able to compete effectively with modern plant and being uneconomic and obsolete.

Another way of expressing the impact of future development is to compare the costs at future plant with existing plants, on the basis of a continuation of present costs of wages, fuel, etc. In that event prices would be likely to fall to the future plant level.

It is a well-established fact that productivity advances in Britain are more sluggish than in most other advanced countries. Productivity growth in steel has been a little over 3 per cent. per annum, compared with just over 2 per cent. for the UK economy as a whole. But both these figures are well below the corresponding growth rates in western Europe. Concern is not so much with the absolute level of efficiency, or with the comparative level of steel prices, which are not dissimilar, but with the faster pace of productivity advance in competing countries and with the possible implications for the years ahead.

What can be done about this situation? Two lines of approach, one internally through the industry, and the other relating to general national policies, will be referred to here.

Operational Efficiency

So far as internal possibilities are concerned, these consist in part of measures to increase efficiency in general operations. These measures are frequently just as valuable for old as for new plant, and in some cases there is even more possibility of improvement than at newly installed plant. There is thus a prospect of productivity increase quite apart from that secured by the replacement of older equipment with newer and more efficient plant.

In general, however, it would seem that in the steel industry the possibilities of greater efficiency in a given plant are less striking than those obtained by replacement of plant. A preliminary study suggests that firms that have replaced only a minor part of their plant over the past 15 years have increased their productivity by about 1 per cent. a year, or only a third as fast as the industry generally, and much less than a third as fast as the firms that have substantially replaced old by new equipment. Nevertheless, there may be considerable scope for greater efficiency apart from modernization.

Further co-operation by management and unions in this important matter may well give valuable results.

It may also be possible by research and development work to find new types of capital equipment capable of giving a still greater economy in operating cost at the pace-setting new plants. Perhaps even more important than that these plants should have lower operating costs, is that they should give a greater output from a given capital expenditure. There are, fortunately, many examples of current development along these lines in the steel industry. Any policy for increasing productivity must give intensive attention to these future possibilities.

The other main line of approach to faster productivity growth is to consider whether the external factors bearing on industry could or should be adjusted in any way to encourage the more rapid movement from one end of the productivity scale to the other. The possibilities here relate in the main to arrangements which might change the *true* balance of costs as seen by a manufacturer in the direction of reducing those peculiar to modern plant while increasing those at old plant. A comparison with the situation in competing countries is useful here.

An obvious initial approach might be to think that if wages were more rapidly advanced, this would speed up the change from more labour-intensive to less labour-intensive methods of production. This, however, would not necessarily occur, since the higher labour cost, while undoubtedly putting up costs at old plant, will also, and almost proportionately, increase the costs of the new capital equipment which ultimately is predominantly made up of labour cost. A wage increase, however appropriate on other grounds, will therefore not in itself necessarily alter the balance of cost between the use of old plant and the installation of new.

Policies designed to speed up productivity increases must be ones which differentially affect old and new plant or less and more efficient production.

Interest Rates

A major debit against new plant is related to the rate of interest. One per cent. more in interest charges would represent an addition of approaching £1 per ton to the costs of steel produced at a new plant.

If this occurs, it would pay to keep in operation an old plant with a labour cost considerably higher than at present.

The figures shown in Table 2 were extracted from published accounts covering the bulk of steel output in the UK and western Europe. They are illustrative of the position, but comparison is diffi-

TABLE 2.—*Comparison of Capital Earnings of Steel Companies (Average 1955-59).*

	UK. 15 Companies.	Western Europe. 52 Companies.
	Per ingot ton.	Per ingot ton.
Disposal of gross earnings:	s.	s.
Depreciation (as written off by companies)	34	77
Retained profits (incl. allocation to fixed asset reserves)	53	18
Total retained in business	87	95
Gross dividends and interest (before income tax)	36	30
	123	125
Taxation (other than income tax on dividends and interest and turnover and employment taxes)	44	28
	167	153

cult and they can only be regarded as giving a broad indication.

The total earnings for retention in the business and for distribution to investors is surprisingly similar in the two cases. The treatment of depreciation is very different in the accounts and, to some extent, this reflects a real difference. The gross profits distributed are rather higher in the UK.

This is related to a higher investment per ton of capacity, itself arising partly from the different depreciation treatment. Also, the gross profits distributed are subject generally to higher taxes in the hands of recipients in the UK than on the Continent, and net profits are likely to be very similar. The striking difference in the figures is the lower tax on the capital earnings of the companies on the Continent. This is lower by 16s. a ton of ingots, or by over £1 per ton of finished steel.

Employers on the Continent, as a converse to lower taxes on earnings created by investment, pay higher taxes in proportion to the labour employed than in the UK. Taking the taxes a firm pays on its employment costs and capital earnings, it would seem that the aggregate burden is roughly similar in the case of steel, in the two areas. But as between employment and capital taxes the incidence is very different. The continental system bears much more lightly on the capital-intensive high-productivity firm, while the UK system bears more heavily on such a firm but more lightly on the low-productivity firm with little remaining capital. A rebalancing of the taxes falling on companies in the continental direction might be one of the measures which could help towards faster productivity growth.

Conclusion

The problem of the '60s is that of efficiency and cost reduction. This involves a speeding up of productivity growth in the steel industry and, indeed, in the economy as a whole. There are great potentialities here. If realized, they will help in raising living standards and in strengthening our oversea balance. I have given examples of the working of the distinctive combination of competition with planning in the steel industry. The synthesis is I believe of value in itself. It is also an experiment of significance in the developing relationships between large-scale industry and the public interest.

Finally, quite apart from these economic issues, the future of the industry depends above all else on individuals: on their seeking out new ideas, grasping them and trying with imagination yet care to put them into operation. The steel industry is showing an increasing readiness to look frankly at its weaknesses as well as to be exhilarated by its achievements, and I am confident that it will continue to make a great contribution to the progress of this country.

The Tully Unispan Carport

A NEW, modern structure for covered parking, the Tully Unispan Carport, has been developed by the Tully Engineering Company, Limited, Newark (Notts), to meet the demand for a lightweight contemporary construction in keeping with present-day building trends. Essentially, the Carport is a translucent curved awning, open at both ends and near ground level at the back, supported by cantilevered metal trusses anchored in a concrete base. The roof sheets are of a new resin-bonded glass-fibre material which, though light in weight, is very strong, will not crack, and is non-corrosive. The material is supplied in a range of attractive colours, including blue, red, green, violet, and orange.

The sheets, which are corrugated, are lapped together, each sheet being in one length, 25 ft. from near ground level to front edge of awning. There are no horizontal joints. The Unispan trusses are made from rolled steel hollow box sections and the purlins are z-section. The structure can be finished in white enamel or in any shade. Since the design is sectional, any length of covered parking space can be provided and spans can be erected back-to-back on a common base if required.

THE TULLY UNISPAN CARPORT.

The structural engineering division of the Tully Engineering Company specializes in the design and erection of steel structures for industrial, commercial, and agricultural buildings of all types.

COAL SUPPLIES IN INDIA

Industries Hit by Shortage

ALTHOUGH coal production in India during 1960 was a little higher than in the previous year, it was very much behind the requirements of various industries. The shortage was, in fact, so acute, particularly in respect of coking coal, that the steel plants, railways, and a number of factories could not operate to their full capacity.

The reasons for the shortage, according to the Golden Jubilee issue of Commerce, were that the pace of increase in output, especially in the public sector, was slow, the ash content of the coking coal was high, and there was considerable delay in the construction of new washeries. There was a general deterioration in the quality of the coals raised and the transport position was unsatisfactory, with the result that stocks of coal at pitheads began to accumulate.

Policy Changes

A slight change in the coal policy of the Government, by granting permission to individual coal companies in the private sector to work new and non-contiguous areas where the raising of coal from such areas had to be ensured to make up the total production required, should enable the more efficient and resourceful units to increase their production, provided this permission is accompanied by suitable incentives. The change, however, came too late to affect production in 1960.

The Bengal Coal Company, the foremost coal producer in India, has already announced its decision to raise fresh capital for expansion through a new issue of equity shares. This is the first equity issue by an existing coal company for a very long time, and as such is a landmark in the history of the coal industry in India.

As will be seen from Table 1, the production during the first nine months of 1960 was 37,880,000 tons, against 35,340,000 tons in the corresponding period of 1959. On the basis of the average production during this period, the output for the whole year may be in the order of 50,510,000 tons. This figure is 9,500,000 tons below the second plan target of 60,000,000 tons. On the basis of the analysis of available figures, it is estimated that the private sector's share in the total output for the year will be 45,000,000 tons, thus fulfilling its second plan target. The public sector's share is 5,500,000 tons, which means that the entire shortfall in the target, namely, 9,500,000 tons, is due to the failure of the public sector to come up to expectations.

The additional burden on the public collieries to achieve the target during the third-plan period will be 29,500,000 tons. A part of this burden is likely to be taken up by the private sector if the latest amendment to the coal policy is satisfactory.

The delay in the establishment of washeries in the public sector proved to be a serious handicap to steel plants. Of the four washeries proposed, only one, at Kargali, has been commissioned, with a capacity of 100,000 tons of clean coal per month. The one at Dugdah, with a capacity of 1,800,000 tons of clean coal per year, is expected to go into production this year.

It was originally expected that all the washeries, including those in the private sector, would produce 9,000,000 tons of clean coal per year by the end of the second plan, but this expectation has not been fulfilled.

The magnitude of the problem can be assessed from the fact that the requirements of the steel industry have risen from 3,300,000 tons in 1956 to 12,000,000 tons. By the end of the third plan they are expected to reach 23,000,000 tons per year.

However, the existing washeries, installed or under construction, are sufficient to produce only 12,000,000 tons per year. This means that the additional capacity to be provided for during the third plan period is 11,000,000 tons per year.

TABLE 1.—*Output and Despatches of Coal (in million tons) in India During the First Nine Months of* 1960.

	Output.		Despatches.	
	1960.	1959.	1960.	1959.
January	4.116	4.086	3.605	3.436
February	4.296	3.938	3.527	3.112
March	4.364	3.957	3.758	3.486
April	4.382	3.984	3.747	3.529
May	4.351	4.014	3.605	3.396
June	4.141	3.814	3.690	3.355
July	3.977	3.860	3.570	3.593
August	4.119	3.750	3.847	3.608
September	4.132	3.936	3.896	3.584
Total, Jan.-Sept. ..	37.878	35.339	33.245	31.099
Whole of 1959 ..	—	47.059	—	41.603

Chemical Engineers' Symposium

A one-day symposium, organized by the Midlands Branch of the Institution of Chemical Engineers, is to be held in the Chemical Engineering Department of the University, Edgbaston, Birmingham 15, on April 12, when the following papers will be presented:—"Fabrication and Properties of Some of the Newer Constructional Metals," by Dr. N. P. Inglis (Metals Division, Imperial Chemical Industries, Limited); "Recent Developments in Wrought Corrosion Resistant Nickel-base Alloys," by E. Warde (Henry Wiggin Company, Limited); "Plastics in Chemical Engineering and Building," by S. Slaney (Shell Chemical Company, Limited); "Glass Fibre Wound Laminates," by Dr. F. F. Jaray (consultant), and "Recent High-temperature Ceramics," by Dr. A. T. Green (consultant). Applications for registration forms should be made to Mr. T. R. Bott, hon. secretary of the branch, The University, Edgbaston, Birmingham 15.

HM Mines Inspectorate Address List

THE following changes in the address list of HM Inspectorate of Mines and Quarries are announced by the Ministry of Power.

East Midland Division

Comprising the counties of Derby (excluding the parishes of Yeardsley-cum-Whaley and Taxal), Leicester, Rutland, Northampton, Huntingdon, Oxford, Lincoln, and Nottingham.

Headquarters: Huntingdon House, Huntingdon Street, Nottingham. Telephone: Nottingham 53217/8.

Divisional Inspector of Mines and Quarries: H. S. Stephenson, divisional headquarters. Home address: 58, Rodney Road, West Bridgford, Nottingham. Telephone: Nottingham 23-2744.

Senior District Inspector of Mines and Quarries: G. Miller, divisional headquarters. Home address: 178, Harrow Road, Wollaton Park, Nottingham. Telephone: Nottingham 71043.

District Inspector of Mines and Quarries: R. A. Ridsdale, divisional headquarters. Home address: 14, Moor Lane, Bramcote, Nottingham. Telephone: Nottingham 258366.

Electrical Inspector of Mines and Quarries: A. M. Martin, 24, Patterdale Road, Woodthorpe, Nottingham. Telephone: Nottingham 263528.

Inspector of Mechanical Engineering: A. M. Hepburn, 17A, Cavendish Crescent South, The Park, Nottingham. Telephone: Nottingham 42749.

Inspector of Quarries (that part of the East Midland Division south of the river Trent): R. H. Moore, 17, Bridle Road, Bramcote, Nottingham. Telephone: Nottingham 256915.

Inspector of Quarries (that part of the East Midland Division north of the river Trent): R. E. Griffiths, 124, Marsh Lane, Crosspool, Sheffield 10. Telephone: Sheffield 64213.

Inspector of Horses: T. J. Melody, "Hillken," Four Lane Ends, New Tupton, Chesterfield.

North Nottinghamshire and North Lincolnshire District

Comprising that part of the county of Nottingham north of a line drawn due east from Pleasley Church to the county boundary of Nottinghamshire and Lincolnshire; that part of the county of Lincoln known as Lindsey, and that part of the county of Derby east of a line drawn from Pleasley Church to the junction of the boundaries of the counties of Derby, Nottingham, and York.

Headquarters: 10-12, Bridge Street, Worksop (Notts). Telephone: Worksop 3830.

Senior District Inspector of Mines and Quarries: F. Bishop, district headquarters. Home address: Wigthorpe Lane, Carlton-in-Lindrick, near Worksop (Notts). Telephone: North Carlton 420.

District Inspector of Mines and Quarries: A. Chaplin, 160, Oak Tree Lane, Mansfield (Notts). Telephone: Mansfield 6731.

Inspector of Mines and Quarries: G. W. Taylor, 7, Harewood Road, Carlton Road, Worksop (Notts). Telephone: Worksop 2820.

West Midland and Southern Division

Comprising the counties of Stafford, Salop, Warwick, Worcester, Hereford, Cambridge, Berks, Buckingham, Bedford, Hertford, Middlesex, Norfolk, Suffolk, Devon, Cornwall, Dorset, Hants, Isle of Wight, London, Surrey, Kent, Essex, and Sussex. (Note: South-eastern England comprising the counties of Norfolk, Suffolk, Cambridge, Bedford, Buckingham, Berks, Hertford, Essex, London, and Middlesex, is administered from the divisional office).

Headquarters: Richmond House, 84, Newhall Street, Birmingham 3. Telephone: Birmingham Central 6016.

Divisional Inspector of Mines and Quarries: F. S. Pollard, divisional headquarters. Home address: 14, Cillhurst Road, Harborne, Birmingham. Telephone: Harborne 4015.

Senior District Inspector of Mines and Quarries: E. J. Reine, 87, Harbourne Road, Edgbaston, Birmingham 15. Telephone: Edgbaston 2087.

District Inspector of Mines and Quarries: J. V. Spence, divisional headquarters. Home address: 111, Anderton Park Road, Moseley, Birmingham 13. Telephone: Birmingham South 0680.

Senior Inspector of Quarries: A. Oliver. Home address: 10, Montague Road, Edgbaston, Birmingham 16. Telephone: Edgbaston 0227.

Electrical Inspector of Mines and Quarries: C. R. Mansfield, 7, Lynton Avenue, Weeping Cross, Stafford. Telephone: Milford 125.

Inspector of Mechanical Engineering: J. Lawson, 58, Rowallan Road, Moor Hall Estate, Sutton Coldfield (Warwickshire). Telephone: Four Oaks 2154.

Inspectors of Quarries: J. Cusack, 64, Belmont Road, Hemel Hempstead (Herts). Telephone: Boxmoor 6498. T. S. King (West of England District): "Ranchi," Woodland Road, Off Hollow Lane, Whipton, Exeter. Telephone: Exeter 67093.

Inspectors of Horses: T. J. Melody, "Hillken," Four Lane Ends, New Tupton, Chesterfield. J. Morris, "Bryn Tol," Min-y-Nant, Rhiwbina, Cardiff.

North Staffordshire District

Comprising all that part of the county of Stafford lying to the north of the road from Uttoxeter through Bramshall Field and Milwich to Stone, and thence through North Bridge, Eccleshall, Croxton, Hockgate, and Almington to Market Drayton.

Headquarters: Rectory Chambers, Ironmarket, Newcastle-under-Lyme (Staffs). Telephone: Newcastle (Staffs) 67906.

Senior District Inspector of Mines and Quarries: L. D. Rhydderch, district headquarters. Home address: Knivedon, Kingsway West, Westlands, Newcastle-under-Lyme (Staffs). Telephone: Newcastle (Staffs) 69086.

District Inspector of Mines and Quarries: J. W. Ryan, 27, Roseacre, Thistleberry Avenue, Newcastle-under-Lyme (Staffs). Telephone: Newcastle (Staffs) 66513.

Inspectors of Mines and Quarries: G. H. Thomas, 5, Margaret Avenue, Trentham, Stoke-on-Trent. Telephone: Trentham 57658. R. Whitehead, 5, Eleanor Place, Westlands, Newcastle-under-Lyme. Telephone: Newcastle (Staffs) 64366.

A WORLD BANK LOAN equivalent to $12,000,000 for the expansion of electric generating capacity on the island of Kyushu, Japan, will assist in financing the construction of a 156,000-kW thermal power plant at Kokura in northern Kyushu, one of the most heavily industrialized areas of Japan. The area concerned has a population of about 13,500,000; it produces more than half of Japan's coal and more than a third of the steel.

New Literature

PUBLICATIONS received include the house magazines, catalogues, booklets, etc., mentioned below. Readers wishing to obtain a copy of any of the items are invited to write to the address given, at the same time mentioning IRON AND COAL.

PRECISION CHAINS, LIMITED, Clayton Lane, Manchester 11—"Steel Conveyor Roller Chains" is the title of a new catalogue (Ref. 53/0). It is a wealth of information on the subject.

NATIONAL UNION OF MANUFACTURERS, 6, Holborn Viaduct, London, E.C.1—The March issue of the British Manufacturer (2s.), is a special oversea marketing number. There are many helpful and interesting articles in this section and, indeed, throughout the issue.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED, 33, Grosvenor Place, London, S.W.1—Articles on "Transmission Electron Microscopy of Dislocation in Metals," "The Silicon-controlled Rectifier," and "Layer-type Windings for High-voltage Transformers" are among the contents of the March issue of AEI Engineering.

UNITED STEEL COMPANIES, LIMITED, The Mount, Broomhill, Sheffield 10—"Review of Progress, 1960," is the title of a 44-page report for employees. It contains a wealth of information about the group's activities, broken down into sections and presented very attractively. Progress, indeed, can be reported and there is news, too, of future plans. This excellent report will certainly fulfil its purpose, but it will prove no less interesting and helpful to others engaged in the steel industry.

THOS. FIRTH & JOHN BROWN, LIMITED, Atlas Works, Sheffield 4—The spring number of Firth Brown News, the house magazine of Thos. Firth & John Brown and Firth-Derihon Stampings, Limited, is largely filled with news of the personnel of the two companies, but there are also two or three articles, including "On Taking Up Yachting." The author was in his late 20s when he first began to appreciate that the wide open spaces spelled relaxation and provided the necessary antidote to a desk job.

BROOK MOTORS, LIMITED, Huddersfield—"Let's Look Back 60 Years," is the invitation made in a two-page spread in the latest (Vol. 23, No. 95) issue of the Brook Magazine In 1901, so we are told, skirts were worn down to the pavement, while the female sea bathers wore costumes to below the knee and stockings—and there's a photograph to prove it! Tottenham Hotspur beat Sheffield United in the F.A. Cup Final. Is football history about to be repeated? Leicester City decided otherwise on Monday night.

PARKINSON COWAN, LIMITED, Tameside Works, Dobcross, Oldham (Lancs)—"Liquid Metering and Dispensing" is the title of a 16-page illustrated brochure. The first of a series of three, this new brochure outlines the construction and application of the company's measurement meters for both water and industrial liquids. There is also a valuable section describing some of the many indicating and control devices which can be used with the meters. "Pumping" will be the second brochure in the series and "Instrumentation" the third.

CONSETT IRON COMPANY, LIMITED, Consett (Co. Durham)—Full information on the physical and chemical properties of the various refractory products made by the company is given in the "Consett Refractories" series of leaflets. Each leaflet describes one product and includes advice on methods of use. The range of bricks and typical uses covered are:—Hiluma (furnace checkers); Zircon (glass tank hearths); Rotacon (rotary kiln linings); Magnesite (mixer linings); Chrome-magnesite (O-H roofs); Chemically bonded Chrome-magnesite and Magnesite-chome (O-H back walls).

TURNER BROS. ASBESTOS COMPANY, LIMITED, P.O. Box 40, Rochdale—Two new publications are to hand from this company. Leaflet AA 67, "Aluminized Asbestos Cloths," has actually fitted into it a sample of quality KST. 317 aluminized asbestos. The sample is fitted in such a way that it is an integral part of the publication and serves as a constant reminder as to the quality of material available. Beltings designed specifically for the iron, steel, foundry, and coke industries are outlined in "Rubber Conveyor and Elevator Belting" (leaflet BA 79), and special reference is made to belting carcases, types available, synthetic-fibre carcases, and the Turners' conveyor belting service.

NATIONAL INSTITUTE OF INDUSTRIAL PSYCHOLOGY, 14, Welbeck Street, London, W.1—Factory workers over 40 tend to be left with the worst jobs, yet managements seem neither to know nor care. Government training centres for the disabled should be used to re-train older employees for better work, possibly on a day-release system. These are among the conclusions of two Medical Research Council investigators who recently studied conditions in 20 Merseyside factories. Their full report will be published later, but a preliminary account appears in the current issue (Vol. 34, No. 4) of Occupational Psychology. It is among a number of interesting articles in the issue.

ANGLO AMERICAN CORPORATION OF SOUTH AFRICA, LIMITED, 40, Holborn Viaduct, London, E.C.1—Optima is a quarterly review published in the interests of mining, industrial, scientific, and economic progress. The March issue contains a variety of articles of considerable interest and value. Mining people will find the article on "Increased Drilling Speed with a Concave Bit" of particular interest. "There has been a striking advance in the design of tungsten carbide drill bits," says the writer. "Extensive research led to a new shape that offers a number of important advantages over the conventional type of chisel bit. The new product is known as a 'saddleback' tip." A four-page supplement on aluminium will appeal to the metallurgists, while among the contributors on more general topics is Vernon Bartlett, so well known in this country in former years as a Member of Parliament, as a writer on foreign affairs in the News Chronicle, and, of course, as a broadcaster. The Afro-Asian bloc has become a powerful force in the United Nations, and will continue to show an increasing interest in the welfare of the native and coloured peoples of South Africa. Mr. Bartlett warns the Western Powers that, in sheer self-defence against Communism, they must do the same.

THE FIRST pig-iron plant in Lebanon, near Beirut, which began production about a year ago, uses a rotary kiln instead of a blast furnace to produce its iron (from local ore of 40 to 55 per cent. Fe), states US Mineral Trade Notes. Of the four other similar plants in the world, three are in Japan and one in West Germany.

Resuscitating Apparatus

DEVISED by Mr. W. K. Dyer, superintendent of the Scottish Divisional Coal Board's Coatbridge Mines Rescue Station, is a new form of resuscitating apparatus. Mr. Dyer's assembly, shown in Fig. 1, enables unconscious people to be carried from irrespirable atmospheres with more ease and efficiency than with existing types. Being less bulky, it is easily transportable by one person and can be laid on a stretcher to free bearers from the often impossible task of carrying a stretcher and the existing type of reviver at the same time.

The apparatus consists of a 20-cu. ft. cylinder of oxygen to which is attached a reducing valve set to pass air at 40 lb./sq. in. A short rubber tube is attached to a lung demand valve attached to a

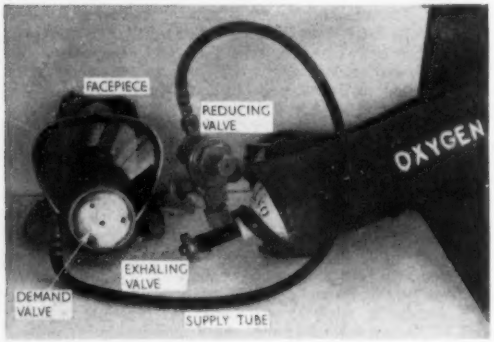

FIG. 1.—COMPONENT PARTS OF THE REVIVING APPARATUS WHICH CAN BE USED IN IRRESPIRABLE ATMOSPHERES.

full-face mask. The demand valve is balanced at 40 lb./sq. in. pressure, cutting off the oxygen during exhalation (when it is not required) and opening at the slightest inhalation.

No component parts of the apparatus are new, but the complete assembly is original. Because of the complete mask seal, artificial respiration can be applied immediately even in an irrespirable atmosphere by rescue men wearing breathing apparatus, before the patient is removed to fresh air.

Development of Fluid Fuel Reactors

Dr. Alvin M. Weinberg (Oak Ridge National Laboratory) will present a paper on the "Development of Fluid Fuel Reactors" at a meeting of the Institution of Chemical Engineers on April 24. The meeting is to be held under the auspices of the British Nuclear Energy Conference and will take place at the Federation of British Industries, Tothill Street, London, S.W.1, at 5.30 p.m. Non-members of the institution are invited to attend; tickets will not be required.

Fuel Cells

FUEL cells have now progressed beyond the stage of being laboratory curiosities and are ripe for engineering development. The very considerable effort which is being devoted to them, especially in the United States, is expected to lead to commercial exploitation within the next five years, according to Dr. H. H. Chambers in a paper presented to the North East Coast Institution of Engineers and Shipbuilders. Unless there is a major break-through in the near future, the first cells for operation on commercial hydrocarbon fuels will be high-temperature cells running above 400 deg. C., and as they will not be capable of rapid start-up, they are unlikely to be used for such things as powering motor cars. They will be quite suitable for any use where the power demand is steady or intermittent, but without long idle periods.

The first commercial batteries are likely to replace small motor generator sets of up to 20 kW output. Larger units may be developed fairly soon after the first appearance of small units.

The future for large central power-station generation is uncertain, says Dr. Chambers. It is too early to predict capital costs, but in view of the high operating efficiency and versatility, it is likely that fuel batteries will begin to become competitive before the capital cost approaches that of diesel generators. Parallel development of other types of cell, including low-temperature cells, is probable, and such cells will be used for special purposes where the relatively high cost of specialized fuels can be tolerated.

EVALUATION OF DUST SAMPLES

PHOTOMETRIC evaluation of konimeter and other dust samples is discussed in SMRE Research Report No. 191 by G. Broomhead, J. R. Hodkinson, and Dr. V. Simons. Light-field microscope images of konimeter samples of airborne dust underground and in the laboratory have been evaluated by both light extinction and by particle counting. Since most of the light scattered is collected, the results depend on absorption in the particles. Even with black particles less than 1 micron, giving an extinction equal to their surface area, the correlation with number count varies with size distribution.

Measurements of scattered light in dark-field images are still more difficult to interpret but easier to make and, like the light-field method, are useful with an empirical calibration in a sufficiently constant dust cloud. In the Tyndalloscope, the light scattered per unit area of black and transparent particles appears to be in the ratio theoretically predicted.

Narrow-angle extinction measurements on size-selected samples offer the best possibility of surface-area determination independent of particle transparency. Supplementary measurements of light scattering through a definite moderate angle may then be used to estimate the transparency of the particles.

IRON AND STEEL TRADE

IN the light of the annual report of the British Iron and Steel Federation with its suggestion that, because of increased fuel costs, steel prices may have to be raised, the marked trend recently for steel users to reduce stocks is likely to be halted. In any event, it is now apparent that the stock-reducing phase is tailing off and some improvement has already been seen in orders for heavy steel products for delivery after the middle of May. Although there is no rush as yet to fill up the blanks in the order-books for the latter portion of the second quarter, a better demand for beams, sections, joists, and medium plate is developing.

Pig-iron

Apart from a few spasmodic and isolated shortages, the foundries have plentiful supplies of raw materials and the ease with which they are able to obtain requirements has not been so apparent for a considerable time. The low phosphorus irons for which demand is now at a substantial level are supplied without difficulty and, in fact, larger tonnages could be supplied if required. Hematite is also in good supply as are the refined irons.

Current production of the high phosphorus irons is more than adequate to meet the call and the present easy supply position of all types of foundry irons does not lend itself to forward buying of which there is very little.

Ferro-alloys

The different grades of ferro-silicon, which are to be increased in price by varying amounts as from April 1, continue to be a well-supported feature of the market, and both the low and high carbon grades of ferro-chrome are receiving steady attention. Calcium silicide is fairly active and there is a good demand for ferro-manganese.

Most other items remain in reasonable request, and it would appear that the only effect of Easter will be to cause a lull on actual holiday days.

Semi-finished Steel

There is little change in the trading position at the re-rollers. The work at present on hand keeps most of the mills fully occupied, although order-books are now on a reduced scale owing to the falling off in demand. Small bars, light sections, and strip have recently shown a decline, but there is still no diminution in the firm call for reinforcing bars and rod.

The position in regard to steel semis is much the same. Most of the re-rollers have good stocks of mild steel billets, etc., and at present there is little demand on home steelworks for supplies.

Finished Steel

Makers of sections and joists are finding that they are having to include more sizes on their rolling programmes to fill in the gaps caused by existing specifications being deferred. The plate makers have still some leeway to make up on existing commitments. Orders for small angles, flats, rounds, etc., can now be placed for reasonably quick delivery.

Demand for cold reduced sheet is still well below normal, the improvement in the motor car industry not having been sufficiently strong or long enough sustained to have a marked effect. Difficulty is being experienced in obtaining easy delivery of special quality bright bars owing to a shortage of the necessary raw material.

Why Brett's Stamping Rejects Offer

GIVING reasons for not recommending the bid made by J. & H. B. Jackson, Limited, the directors of Brett's Stamping Company, Limited, makers of steel and light alloy forgings, upset forgings, etc., of Coventry, in a letter to shareholders forecast higher profits and an increased dividend for the current year and announce plans for a capital profits distribution, a part return of capital, and a scrip issue.

The board states that it considers the offer of six Jackson 1s. ordinary, plus 15s. cash for each of the £1 shares in Brett's £200,000 ordinary capital, as inadequate. It adds that should the offer not be proceeded with it intends making a capital distribution, free of tax, of 4s. per share, representing the major part of the proceeds of the profit on the sale of a part of the quoted investment.

It is also intended to consult legal advisers with a view to a reduction of £50,000 in the ordinary which would enable a distribution of 5s. per ordinary share, tax free. The shares would then be 15s. nominal and it is planned to split these into shares of 5s. and issue by way of capitalization of reserves one additional 5s. share for every three held.

British Rollmakers Records Higher Earnings

HIGHER profits and an increase of 3 per cent. in the dividend for 1960 is reported by the British Rollmakers Corporation, Limited, makers of cast-iron and cast-steel rolls, of Crewe. The company also proposes a one-for-four scrip issue, and the subdivision of the £1 ordinary shares into 5s. units. A final dividend of 11 per cent. makes 15 per cent. for the year on the existing £2,485,267 ordinary capital, compared with 12 per cent. for 1959. Group pre-tax profits, after a heavier depreciation provision, were £1,369,713 (£788,898). The 1959 figure did not include the results of the new subsidiary, Richard Lloyd, Limited, which for that year were £245,631, and if this is added the comparative balances are £1,369,713 (£1,034,529).

The scrip issue will capitalize £621,317 of general reserve, and its purpose is to relate more closely the share capital to the capital actually employed. Authorized capital is to be raised to £4,000,000 by creating 809,153 new £1 ordinary shares.

Coalfield News

Safety Poster Awards by North-Eastern NCB

AWARDS in a safety poster competition organized by the Consultative Council of the North-Eastern Divisional Coal Board were presented by Mr. W. H. Sales, divisional chairman, at Doncaster last week. The winner was Mr. Arthur Bailey (38), a face worker at Hickleton Main Colliery. His entry, his first attempt at a poster competition, depicted a miner's family and a coal face linked by the slogan: "If you must support this . . . you must support this."

The Consultative Council awarded prizes to 50 of the 81 entrants, the second prize going to Mr. William Morgan (46), and the third to Mr. William Cox, both of whom work as painters at Rossington Colliery.

DEPUTY AT Gateside and Tower Colliery in the East Ayr, Scottish Divisional Coal Board, Mr. John McNaught has retired after a life-time's service in the coal industry.

TEN MINERS WERE HURT when a pit train taking men to the coalface jumped the rails 1,900 ft. down at Bullcroft Colliery, near Doncaster, on Monday. None of the men had to be detained in hospital.

SHOTFIRER AT Fauldhead Colliery in the East Ayr Area of the Scottish NCB has been elected president of Sanquhar Bowling Club. He was Scottish champion in 1958 and 1959, and represented Scotland last year in the internationals.

ELECTED CAPTAIN of Sanquhar Golf Club recently was Mr. Ian Harvey, a planner in the Sanquhar/New Cumnock group of the East Ayr Area of the Scottish NCB. Mr. Harvey won the Scottish Divisional Golf Championship last year.

FOLLOWING THE RECENT strike in the Yorkshire coalfield, miners in the Doncaster area are complaining about a shortage of concessionary coal. Although the strike ended two weeks ago, it held up deliveries and caused a backlog of orders.

MORE THAN 1,600 miners at Cwm Colliery, near Pontypridd (Glam), gave 14-day notice on Monday to impose a ban on piecework unless there is an increase in payment rates. They say that piece-work rates have not been revised for 10 years.

SHIPMENTS OF COAL and coke to home and foreign destinations from the South Wales ports last week, at 52,004 tons, was the best performance for a month. It was just under 1,876 tons better than in the previous week, though 8,880 tons below the level of a year ago.

TALKS ARE taking place between NUM officials and the Northern (N&C) Divisional Coal Board about the future of 180 miners who are to lose their jobs at Seghill Colliery (Northumberland). It is not yet known how many men will become redundant, but a number will be transferred to other pits nearby.

HEDLEY PARK COLLIERY (Northumberland), is to be closed in June. During the past few months about 300 miners have left the colliery to work elsewhere, many of them in the Midlands, and last weekend a further 125 were given notice, 75 being offered alternative work. About 45 are likely to become redundant.

COATBRIDGE MINES RESCUE CORPS, with 255 marks out of a possible 300, has won the annual ambulance competition for the Duchess of Hamilton Cup at the Glasgow headquarters of St. Andrew's Ambulance Association. Teams from Auchengeich Colliery and Dalzell Steel Works, were second and third, respectively.

Two West Ayr Mines Close

THEIR reserves of coal exhausted, two mines in the West Ayr Area of the Scottish Divisional Coal Board have been closed. Both Pennyvenie No. 4 Colliery and Sundrum Colliery ceased production on March 10. Pennyvenie Colliery, sunk in 1910, employed about 500 men in its early life, but recently only about 100 men worked there. Most of these have been found jobs in other mines in the Area, a number having been retained for salvage purposes. The screening plant at the colliery will remain in operation as it deals with coal coming from Beoch Colliery.

Sundrum Colliery was sunk in 1953 to work a small area of coal and give employment to some of the miners from Enterkine Colliery which, at that time was running down. Throughout its life Sundrum employed about 80 men with an average output of 100 tons daily. With the exception of a few men retained for salvage operations, manpower has been transferred to Killoch Colliery.

Productivity Goes on Rising in Durham Coalfield

UPWARD trend in productivity continues in the Durham Division of the NCB. In the 11th week of this year, overall productivity reached 23.21 cwt. per manshift against 22.36 cwt. in the same week of 1960. At the face, productivity was 66.55 (65.96) cwt. per manshift. In the first 11 weeks of this year, overall productivity averaged 22.99 cwt. per manshift and 65.71 cwt. at the face, against 22.05 cwt. and 64.88 cwt. respectively last year. A productivity record at Blackhall Colliery was established in the 11th week, with an overall productivity of 25.1 cwt. per manshift. The previous best performance at the colliery was 24.1 cwt.

Mr. R. S. McLaren, divisional production director, said last week that the Mid-east Durham Area of the Division was breaking production records because of the large sums of money spent on reconstruction. Accident rates were also falling.

Too Slender a Majority for South Wales Miners' May Day Strike

ALTHOUGH South Wales miners voted by 41,950 to 40,850 in favour of a one-day strike on May 1 in protest against higher National Health charges, the strike will not take place. Mr. Will Whitehead, president of the South Wales Area of the National Union of Mineworkers, said that on such a grave issue a majority of 1,100 was too slender to ask the coalfield to stop work. He hoped no individual lodges would now take strike action on their own.

A conference of coalfield delegates is to be held before May 1.

PRESENTING AWARDS at an inter-pit first-aid competition recently, Mr. J. E. Longden, general manager, South Barnsley Area of the North-eastern division of the NCB, said, "If we can get 60-70 per cent. of our young mineworkers interested in first aid, we should be able to reduce accidents by 50 per cent." Grange Colliery teams took first and second places in the competition.

THE COAL TRADE

MERCHANTS are now generally concerned with disposing of stocks bought at winter prices and there is not a great deal being done in replenishing stocks, except for the most popular grades. Now that the space-heating load is falling off, pressure for anthracite is diminishing and, although the demand is still firm for anthracite stove nuts, beans, peas, and grains, providing they are first-class descriptions, the market is much weaker for inferior grades. Although the milder weather has seen some adjustment in the demand for industrial fuels, overall there is no slackening in trade.

NORTHUMBERLAND AND DURHAM

Milder weather has left the house coal trade rather dull, but in other directions the position remains steady—a stability maintained by the fact that while, nationally, consumption so far this year is slightly higher overall production is down by some 3,500,000 tons. In the industrial field oil continues to win new consumers and to this extent sets the coal industry a challenge to keep its prices at economic levels.

Criticism of the last price increase continues to reverberate in the iron and steel industry in this region because, while forward orders for steel show some expansion and promise to maintain the high level of output over the second quarter and beyond, competition is nevertheless keen. The industry is a large supplier of shipbuilding steel and with orders for new tonnage in this region having been accepted at practically no profit margin, prices are all the more vital This applies largely to Durham, producing coking coal and industrial cokes, both of which move off steadily. Northumberland, being largely a producer of steam coal, is gaining a stabilized background to its market because of the expanding needs of power stations, while demand for superior large and graded steams remains consistent.

NORTH WALES

The impending holiday has brought a slight increase in demand, but householders are only ordering in small quantities, with the nearness of lower summer prices obviously in mind. Receipts are in some cases more than sufficient to cover current requirements, and some merchants have been forced to suspend supplies of certain grades.

The anthracite position is still very difficult, and traders are taking every opportunity to lay down stocks as the supply position improves. Demand for all grades of coke is still exceptionally strong, and plentiful tonnages are available.

The call for premium smokeless fuels has slackened, with a consequent improvement in receipts.

The requirements of industry are catered for satisfactorily.

WAGE RISE URGED TO MEET PIT OFFICIALS SHORTAGE

PROBLEM of too few young men willing to train as pit officials would not be solved unless there was an improvement in wages and conditions for colliery under-officials, said Mr. Laurie Wormald, secretary of the Yorkshire Area of the National Association of Colliery Overmen, Deputies, and Shotfirers, at the Yorkshire Area Council at Barnsley at the weekend.

The council approved resolutions to be moved at the association's conference at Cardiff next month calling for higher wages and better conditions.

Coal Output and Stocks

OUTPUT of saleable coal at 4,061,800 tons is now in line with last year's comparable output, though so far this year, total output is some 3,500,000 tons down on 1960 and for the first 12 weeks of the year amounts to 45,644,000 tons. The inroads that have had to be made into stocks in order to keep pace with the demand is shown by comparing the figures of inland consumption and export. In the first 11 weeks of the year this amounted to just over 49,000,000 tons—output for the same period was only 41,565,000 tons.

This drain on stocks may not last much longer but a further slight reduction to 23,395,000 tons was recorded for the week ended March 18. Nearly 6,000,000 tons have been cleared from undistributed stocks since the beginning of the year. The drop in stocks last year was only half that amount. Distributed stocks increased slightly to 12,124,000 tons.

There were 579,860 wage-earners on colliery books on March 18, against 618,690 on March 19, 1960, the numbers engaged at the coal face being 217,730 and 237,210 respectively. Total absenteeism (all workers) in the week ended March 18, was 14.63 per cent., compared with 15.05 per cent. in the week ended March 19, 1960. Output at the face was 4.119 tons and overall 1.435 tons in the week ended March 18, compared with 4.015 and 1.427 tons in the week ended March 12.

The following table gives (in tons) the revised output of saleable mined coal by division in the week ended March 25, and the tonnage lost through all causes (holidays, disputes, and go-slows):—

Division.	Week ended March 25, 1961.		Week ended March 26, 1960.
	Total output.	Tonnage lost.	Total output.
Scottish	363,000	3,000	369,000
Northern (N&C) ..	248,000	—	248,000
Durham	477,000	—	472,000
North-Eastern ..	870,000	2,000	855,000
North-Western ..	248,000	1,000	281,000
East Midlands ..	916,000	—	924,000
West Midlands ..	290,000	1,000	303,000
South-Western ..	383,000	4,000	413,000
South-Eastern ..	33,000	—	31,000
Great Britain—			
Deep-mined coal ..	3,828,000	11,000	3,896,000
Other deep-mined (including licensed mines) ..	41,000	—	54,000
Open-cast coal ..	193,000	—	170,000
TOTAL	4,062,000	11,000	4,120,000

Board Changes

C. A. Parsons Appoints New Director

ENGINEERS and turbine manufacturers, C. A. PARSONS & COMPANY, LIMITED, Newcastle-upon-Tyne, has co-opted Mr. E. C. Rippon as a director of the company.

MR. E. C. RIPPON

Mr. Rippon, formerly chief transformer engineer, has during the past year been engaged in matters relating to the organization of design and production throughout the company's works. He has for a number of years represented British interests on international technical committees in the field of transformer engineering and has contributed to standardization work both at home and abroad. He will continue with these interests. Mr. Rippon is a former chairman of the north-eastern area of the Institution of Electrical Engineers, and is a member of the divisional committee No. 3, dealing with switchgear and transformers for power supply, of the Electrical Research Association.

BARROW HEPBURN & GALE, LIMITED—Mr. J. S. Mitchell has resigned from the board.

SPEAR & JACKSON, LIMITED—Mr. A. G. Griffiths has been appointed a special director.

HAWKER SIDDELEY INDUSTRIES, LIMITED—Mr. N. E. N. Plahn, managing director of the subsidiary, Fuller Electric, Limited, has been appointed to the board.

LANG PNEUMATIC, LIMITED—On being appointed general manager and a director, Mr. G. E. Jowitt has retired from the position as secretary. He is succeeded by Mr. G. H. Oxborrow.

COLEY METALS, LIMITED—Mr. R. J. Coley has accepted the office of president on retiring after 19 years as chairman. He will remain a director. Mr. R. W. Coley becomes chairman.

V. L. CHURCHILL & COMPANY, LIMITED—Mr. S. H. Fletcher, who joined the company in 1958, has been appointed managing director. V. L. Churchill is a subsidiary of Charles Churchill & Company, Limited.

HARPER ENGINEERING & ELECTRONICS, LIMITED—Mr. C. E. Harper has ceased to be managing director of the company and its subsidiaries, but retains his seat on the board. Mr. E. M. Morris has been temporarily appointed acting managing director.

MCCALL & COMPANY (SHEFFIELD), LIMITED—Mr. C. W. Hamilton succeeds the late Mr. E. L. Raworth as chairman and continues as managing director of the company, and of the associated company, Macalloy, Limited. He was a founder director of McCalls.

DELTA METAL COMPANY, LIMITED—Mr. A. F. Thomas, assistant managing director, and Mr. D. J. W. Dolton, assistant secretary and personal assistant to the directors, have been appointed to the boards of the subsidiary companies, Sperryn & Company, Limited, and C. H. Edwards, Limited.

JOHN HILL & SONS (IRON FOUNDERS), LIMITED—Mr. G. E. Lunt has been appointed a director of the company, which is a member of the Staveley Industries, Limited, group. He is on the board of the parent company and is managing director of Bradley & Foster, Limited, and its associated companies in the Staveley group.

INTERNATIONAL NICKEL COMPANY (MOND), LIMITED—Mr. H. W. G. Hignett and Mr. Jean M. Dhavernas have been appointed directors. Mr. Hignett remains managing director of Henry Wiggin & Company, Limited. Mr. Dhavernas is located in Paris and has been closely concerned for many years with nickel markets on the Continent.

MUREX, LIMITED—Mr. H. J. Penn has been appointed chairman of the company and of the subsidiary, Murex Welding Processes, Limited, and Mr. F. W. Tomlinson has become deputy chairman of both companies. Mr. H. C. Green has been appointed managing director of Murex, and Mr. J. M. Willey managing director of Murex Welding Processes. The appointments follow the recent death of Sir Arthur Smout.

COX & DANKS, LIMITED—Mr. F. G. Vincent, who has been appointed managing director, joined the company, a member of the Metal Industries, Limited, group, as an office boy in 1933. He opened Cox & Danks' first scrap yard in the Midlands at Langley Green, Birmingham, was appointed manager of the Oldbury works in 1946, and four years later returned to Langley Green as Midlands director.

STAVELEY IRON & CHEMICAL COMPANY, LIMITED—Mr. C. H. M. Owen, who is also a director of the Sheepbridge Company, Limited, Chesterfield, retires this week-end. He joined the company as a laboratory assistant in 1913 and in 1934 was appointed chief engineer at the Devonshire Works. He was made general manager in 1952 and a director in 1954. He joined the Sheepbridge board a year later.

Edgar Allen's Executive Changes

NUMBER of executive changes are announced by Edgar Allen & Company, Limited, steelmakers, engineers, founders, etc., of Sheffield. From tomorrow (Saturday), Dr. Edwin Gregory and Mr. Bernard Blackwell Green, directors, relinquish the full-time executive positions as chief metallurgist and general sales manager, respectively, but will continue as non-executive directors and to serve the company in a consultative capacity.

Having regard to the impact of increasingly complex trading conditions, the board has decided that its "executive" members should be relieved of responsibility for day-to-day management of production or other departments so that they may devote more attention to wider issues of policy, development, and expansion. Executive responsibilities have therefore been allocated as follow:—Mr. W. H. Higginbotham, chairman and chief executive; Mr. J. Higginbotham, all commercial activities; Mr. W. G. A. Jenkins, foundry and steel melting, steel, saw, magnet, works engineering and ancillary operations, operational research; Brig. A. Levesley, marketing; Mr. W. J. McBride, engineering (including machining), trackwork, engineers' tools, development and research; Mr. F. A. Ross, secretary and chief accountant.

Consequent senior managerial appointments are:—Mr. W. H. Everard, manager foundry and ancillary departments; Mr. J. D. Studholme, manager, engineering department; Mr. F. Haigh, sales manager.

Company News

STEEL AND THE CAR INDUSTRY

Hadfields' Chief on Paradox of Falling Demand

PARADOX of a falling-off in the demand for steel supplies at the same time as there had been increased activity in the motor-car industry, was referred to by Lord Dudley Gordon, chairman of Hadfields, Limited, steel manufacturing and engineering group, at the company's annual meeting last Friday. It was quite possible, he said, that this might be partly due to what had been referred to as "stock fluctuations" by the president of the British Iron and Steel Federation, Mr. C. R. Wheeler, in his recent annual review of the industry.

Mr. Wheeler had referred to the under-employment capacity in the steel industry, when supplies were taken from stocks held either by merchants or direct users rather than ordered direct from the mills. It was quite possible, therefore, for the decline in demand to come later than the decline in sales by the motor-car and similar industries, and for the resumption of increased demand for steel to follow on later.

Apart from this particular case, said Lord Dudley Gordon, orders in hand both with the parent company and the Millspaugh, Limited, subsidiary could be looked upon as satisfactory at present.

It had been reported that in the closing stages of the Leipzig spring fair, a contract was signed by the agents of Millspaugh for cardboard-making machinery to the value of £425,000. It should be understood, the chairman said, that this was one of those cases which was not yet fully completed.

Rise of £6,000,000 in ICI Group Net Profit

GROUP net profits of Imperial Chemical Industries, Limited, rose by £6,000,000 to £47,570,000 in 1960, and the dividend is raised from 2s. 3d. to 2s. 9d. per £1 ordinary share, as forecast. The final dividend is unchanged at 1s. 6d. per unit. Group sales were £49,000,000 higher at £558,000,000, and the f.o.b. value of ICI exports from the UK was £96,600,000 (£87,500,000).

Group income, after depreciation of £37,260,000 and after the employees' profit sharing scheme of £8,560,000, amounted to £88,040,000 against £73,120,000. Group income applicable to Imperial Chemical totals £45,190,000 against £39,310,000, and the parent's net income of £39,700,000 compares with £33,860,000 previously.

RUBEROID COMPANY, LIMITED—The dividend is raised to 21 (16) per cent. with a final of 15 per cent. for the year to January 1, 1961. Profits increased from £250,865 to £290,301.

BRUNTONS (MUSSELBURGH), LIMITED, steel rollers, wire rope manufacturers, etc.—Consolidated trading profits increased to £611,472 (£437,465) and the dividend is raised from 22½ per cent. to 30 per cent.

BRITISH BELTING & ASBESTOS, LIMITED—Whole of its interest—17,000 ordinary £1 shares out of a total of 17,650—in George Sampson & Son, Limited, has been sold to Charles Walker & Company, Limited, of Leeds.

BROOM & WADE, LIMITED, air compressor manufacturers, of High Wycombe (Bucks)—A one-for-six rights issue of 1,250,000 ordinary shares at 22s. 6d. per share will be made to ordinary stockholders registered on March 24.

WHEWAY, WATSON & MCLEAN, LIMITED, chain manufacturers, etc., of Walsall (Staffs)—The dividend of 20 per cent. on £140,000 for 1960 compares with 25 per cent. for 15 months on £70,000. Group profits were £58,532 (£52,120 for the period).

R. W. CRABTREE & SONS, LIMITED, manufacturers of printing machinery, of Leeds—Group profit expanded from £375,947 to £448,594 and the dividend is raised by 2 per cent. to 10 per cent. After tax of £223,788 (£202,744), the net balance is £224,806 (£173,203).

ADAMANT & WESTERN ENGINEERING COMPANY, LIMITED—The interim dividend is raised by 1 per cent. to 5 per cent. in respect of the year ending June 30, 1961. Group trading results to date show an improvement over last year and the order position remains satisfactory.

MILES DRUCE & COMPANY, LIMITED—Final dividend of 12½ per cent. on the capital as increased by a one-for-four rights issue is recommended, making the total for 1960 22½ (16⅔ equivalent) per cent., adjusting for a 50 per cent. scrip issue. Group profit, before tax, is £359,790, compared with £206,464.

JOSIAH PARKES & SONS, LIMITED, lock and builders' hardware manufacturers, of Willenhall (Staffs)—The dividend is raised from the equivalent of 13⅓ per cent. to 15 per cent. on capital increased by a one-for-two scrip issue. Group profit amounts to £360,158 (£336,447), and tax is £166,356 (£150,045).

TONKS (BIRMINGHAM), LIMITED, brassfounders, etc.—A conditional agreement has been entered into the acquisition of Walter Rowley, Limited, non-ferrous founders, also of Birmingham, for £360,000. Of the consideration £120,000 will be satisfied in cash and £240,000 by the issue of 300,000 Tonks 5s. shares at 16s. per share.

JOHN G. STEIN & COMPANY, LIMITED, makers of firebricks, refractories, etc., of Bonnybridge (Stirlingshire)—Net profits for 1960 expanded from £380,810 to £674,386, and a final dividend of 7½ per cent. makes

12½ per cent. on the ordinary shares, against 10 per cent. previously. The net profit is after a tax charge of £630,000 (£353,000).

SAMUEL OSBORN & COMPANY, LIMITED—Interim dividend in respect of the year to July 31, 1961, is being raised to 15 (10) per cent. and forecasts are for a final of not less than 25 per cent. A total of 35 per cent. was paid for 1959-60. The directors state that at present orders on hand for the main activities are good, and, in some cases, heavy.

HALL ENGINEERING (HOLDINGS), LIMITED—Group turnover reached over £12,000,000 for 1960 and profit, before tax, at £1,022,563, exceeded £1,000,000 for the first time. A final dividend of 10 per cent. makes 17½ per cent. on capital increased under the acquisition of Perfecta Motor Equipments, Limited, compared with 12½ per cent. on the old capital previously.

GEORGE ANGUS & COMPANY, LIMITED, power transmission, fire, gear and fluid sealing engineers, of Newcastle-upon-Tyne—Group trading surplus expanded from £766,000 to £1,121,000 for 1960. The final dividend is raised from 10 per cent. to 12½ per cent., making a total of 20 (15) per cent. After all charges, group net profit has increased from £372,000 to £547,000.

BROWN BROS., LIMITED, stockholders of ferrous and non-ferrous metals, etc., of London, E.C.2—It is improbable that some departments will be able to return the particularly high level of sales of the early part of 1960 in the comparable period this year, but, states the chairman, Sir Richard Yeabsley, the board is by no means dissatisfied with the results of the first two months of the year.

SWAN, HUNTER & WIGHAM RICHARDSON, LIMITED, ship builders, repairers, etc., of Wallsend—In addition to maintaining the 10 per cent. dividend with a 7½ per cent. final for 1960, there is to be a bonus of 2 (nil) per cent. The group trading surplus struck after charging depreciation improved to £2,097,268 (£1,924,037). The net profit of £1,419,005 compares with £1,258,523, after tax.

P. & W. MCLELLAN, LIMITED, bridge and wagon builders, iron, steel, and hardware merchants, etc., of Glasgow—A group loss of £1,412 was incurred in 1960, compared with a previous profit of £48,336, after a net tax credit of £14,673 (£20,481 charged). The dividend on a capital increased by a one-for-three scrip issue is 6 per cent. The equivalent for 1959 was 9¾ per cent., plus a special distribution equal to 2½ per cent. out of capital profits.

Simon Engineering Offer for W. S. Barron & Son

OFFER for the whole of the preference and ordinary capital of W. S. Barron & Son, Limited, milling engineers and ironfounders, of Gloucester, with the exception of the 31 per cent. of the ordinary share capital which is already owned by Henry Simon (Holdings), Limited, has been made by Simon Engineering, Limited, and has been accepted.

The consideration in the case of the preference is £7,500 cash, and in the case of the ordinary, of 170,709 ordinary 5s. shares of Simon Engineering, on the basis of three Simon shares for each two £1 ordinary Barron shares.

SHIPPING INDUSTRY depression has adversely affected the income and activities of the Parsons and Marine Engineering Turbine Research and Development Association (Pametrada) and certain researches have had to be postponed or curtailed, says the annual report.

British Compressed Air Society

WORK abroad by UK constructional engineering firms amounted to £130,000,000 a year, said Mr. E. C. Beck, managing director of John Mowlem & Company, Limited, and chairman of the Council of the Export Group for the Constructional Industries, at the annual luncheon of the British Compressed Air Society in London last week. He referred to the great amount of plant, including compressed air equipment, required for any large contract.

Mr. E. A. Martin, whose two-year term of office as president ended later in the day, presided at the luncheon. In the evening, Mr. G. H. Hardy, of the War Office, spoke on the testing of air compressors required for arduous conditions.

The Council members of the society for 1961-62 are: Ordinary council members: Mr. P. C. Bevis (Broom & Wade, Limited), Mr D. A. Hannay (Cooper-Stewart Engineering Company, Limited), Mr. E. A. Martin (Padley & Venables, Limited), Lt.-Col. K. Reavell (Reavell & Company, Limited), Mr. R. A. Rust (Joy-Sullivan, Limited), Col. R. W. W. Taylor (Lang Pneumatic, Limited), Mr. C. T. Wardman (Air Industrial Developments, Limited), Mr. J. M. Williams (Holman Bros., Limited); Associate council members: Mr. I. E. Graham (James Howden & Company, Limited), Mr. S. A. Gregory (A.E.I.-Birlec, Limited); Ex-officio council members: Immediate past-president, Mr. E. A. Martin; hon. technical director, Mr. T. C. Hore.

At the first meeting of the new Council, Lt.-Col. K. Reavell (Reavell & Company, Limited) was elected president, and Col. R. W. W. Taylor (Lang Pneumatic, Limited) was elected vice-president of the Society. Mr. T. C. Hore (Holman Bros., Limited) was re-elected hon. technical director, and Mr. H. S. Parsons (Consolidated Pneumatic Tool Company, Limited) was re-elected hon. publicity officer.

ICI Board Appointments

SUCCESSOR as technical director of Imperial Chemical Industries, Limited, to Dr. Richard Beeching, who takes over as chairman of the new British Railways board on June 1, will be Mr. Harold Smith, at present chairman of ICI's general chemicals division. He has been with the company since 1929.

Mr. M. J. S. Clapham becomes oversea director of ICI in place of Dr. J. S. Gourlay who is to be Group "A" director, alkali and general chemicals. Mr. Clapham started with ICI in 1938 in the metals division, being seconded to the Tube Alloys (Atomic Research) organization for the war years. He became chairman of the metals division in January, 1960.

Keen Competition to Export to India and Pakistan

ACCORDING to Mr. Alfred J. Nicholas, managing director of South Wales Switchgear, Limited, who has just returned from a five-day tour of India and Pakistan, nowhere in the world is export competition keener than in these two countries. "Because they are members of the Commonwealth, India and Pakistan are Britain's most powerful link with Asia," he said.

"But we must be on our toes to sell there. Persistent competition comes from manufacturers in Europe, America, Japan, and the Iron Curtain countries."

NEWS IN BRIEF

NEW COMPANY has been formed by Opperman Gears, Limited, gear manufacturers, etc., of Newbury (Berks), to deal with its growing export business. The company is L.S.A. (Exports), Limited.

FERODO, LIMITED, has opened new premises at Ferodo House, 116, Princes Street, Ipswich. Considerably greater storage capacity will enable the new depot to give speedier delivery.

ACTUAL PRODUCTION of raw steel in the US during the week ended March 27 totalled 1,611,000 net tons, compared with 1,574,000 tons in the preceding week, according to the American Iron and Steel Institute.

THE F. Dupre, Limited, group of companies is in process of centralization and F. Dupre, Limited, has joined its associate, Dupre Vermiculite, Limited, in its new factory at 39, Tamworth Road, Hertford (Telephone: Hertford 4626/7).

WEST GERMAN iron and steel company, August Thyssen-Hütte, AG, increased production of crude steel by 25 per cent. to 3,900,000 tons in 1959-60. Rolled steel production of 3,100,000 tons also exceeded the previous year's by 25 per cent.

NEW COMPANY, Engineering Laboratory Equipment, Limited, has been formed jointly by Soil Mechanics, Limited, and Griffin & George, Limited, to provide a comprehensive service at home and oversea in connection with engineering laboratories.

A BRITISH COMPANY, Chrysler Airtemp, Limited, has been formed by Chrysler International to expand marketing throughout the UK of its refrigeration, air-conditioning, and heating equipment, and of Chrysler marine and industrial engines.

NO FEWER THAN 170 rubber manufacturing firms have now joined the Federation of British Rubber and Allied Manufacturers under its new scheme for direct membership of individual firms. This represents between 85 per cent. and 90 per cent. of the industry.

THE HEAVY MILLS department at Round Oak Steel Works, Limited, Brierley Hill (Staffs), has broken its own recently-established weekly production record in the rolling mills. The cogging mill output last week was 11,838 tons of ingots. This breaks the previous record of 11,132 tons achieved during the week ending February 4.

IN ITS MONTHLY newsletter, the Industrial Association of Wales and Monmouthshire invites inquiries from industrialists interested in exploiting Welsh peat deposits, which, says the association, could be a sound commercial proposition. One of the few peat bogs large enough for commercial development is at Tregaron (Carmarthenshire).

TURNOVER LAST YEAR, excluding deliveries within the group, of the Krupp coal, steel and engineering complex, totalled DM 4,126,000,000 (£370,000,000), compared with DM 3,484,000,000 in 1959. Exports rose to DM 822,000,000 (DM 677,000,000). Nearly half the gross turnover was accounted for by the steel and coal interests grouped in the Rheinhausen company.

A NEW COMPANY, Telcon Plastics, Limited, is to take over the entire range of activities of the plastics division of the Telegraph Construction & Maintenance Company, Limited. The board is as follows:—Mr. W. C. Smith (chairman); Mr. J. L. Fergus (general manager); Mr. D. Norman-Thomas, and Mr. H. F. Wilson. The secretary will be Mr. L. G. F. Sliney.

THREE FIRMS, Sir William Arrol, Limited, Cleveland Bridge & Engineering Company, Limited, and Dorman Long (Bridge & Engineering), Limited, have formed a company known as Associated Bridge Builders, Limited, to submit a joint tender for the building of the Severn bridge. The same companies formed a partnership to build the new Forth road bridge, which they are now constructing under the title of ACD, Limited.

WEEK'S RESIDENTIAL COURSE on "Heat Transfer" was completed last week by about 140 technologists from industry, universities, and Government departments. The course was organized by the Department of Extra Mural Studies and the Department of Fuel Technology and Chemical Engineering at Sheffield University. Prof. M. W. Thring, Professor of Fuel Technology at Sheffield, was the director of studies.

JOINT SUBSIDIARY has been set up by the Argentine company, Acindar, and Deutsche Edelstahlwerke, AG, the August Thyssen refined steel works, with the title of Marathon Argentina, Aceros Finos y Especiales, SA. The company is to erect a plant for the production of refined and special steels near San Nicolás, where Acindar already has production units. It will produce 50,000 metric tons a year of 20 differing qualities.

HIGH AUTHORITY of the European Coal and Steel Community has authorized an agreement between the two West German steel companies, Hüttenwerk Salzgitter, AG, and Ilseder Hütte Peine, AG, the main aim of which is specialization of production and common marketing of iron and steel bars. Salzgitter will cease production of profiles, wide-flanged beams, piling iron and rails, and Ilseder will stop manufacturing hot and cold rolled sheets, medium plate and boiler plate, tubes and bands and strips of up to 600 mm. Both firms will be able to produce universal plate. The agreement covers 15 years.

Obituary

The death has occurred of Mr. WILLIAM HENRY BISHOP, governing director and founder of Weathershields, Limited, car accessory manufacturers, of Birmingham.

Sir PATRICK ASHLEY COOPER, a former member of the Court of Directors of the Bank of England, died suddenly at sea on Wednesday of last week. He was 73. Sir Patrick had been a director of the General Electric Company, Limited, and Aron Electricity Meter, Limited, and at one time had been a director of some 60 companies.

The death has occurred of Mr. HENRY SANDERSON SHORT, a former chairman of Short Bros., Limited, shipbuilders, of Sunderland. He was 73. Grandson of the founder of the company, Mr. Short was appointed to the board in 1922 and became chairman in 1948. He retired from the chairmanship in 1955 and from the board two years later.

Mr. JAMES KING, who worked in the Durham coalfield for 43 years until his retirement 18 months ago, has died aged 62. After starting his career with the Wearmouth Coal Company, Limited, he became undermanager at Hylton Colliery and later manager of Ryhope Colliery. After nationalization he was manager of several collieries in south-west Durham and was associated with the sinking of the New Shildon and West Auckland drifts. In 1956 he gave up managerial work and accepted a post in the production department at No. 4 Area headquarters of the Durham Divisional Coal Board.

The Scrap Markets

What of the Future?

SOME indication that the present call for scrap does not inspire complete confidence in the merchant was given in South Wales when the new president of the South Wales and Western Counties Association of Iron and Steel Scrap and Tinplate Merchants, Colonel W. Harold John, wondered whether the trade would play a big part in meeting the increasing quantities of raw materials needed in the widespread steel expansion plans, or whether science and new processes would result in its role becoming an ever-diminishing one.

However, with visible evidence of steelworks' expansion on all sides, merchants are confident, at least, for the immediate future. Present consumption is high and some fluctuation in demand is put down to the reduction of the large stocks that were accumulated by users in readiness for a hard winter.

Cleveland—Reserves laid in during the autumn in expectation of transport difficulties have mounted rather than decreased and scrap merchants are experiencing intermittent periods when limited deliveries are accepted and when acceptances are stopped for a time to clear stocks and facilitate rail unloadings at the works.

The severity of the effect of this policy has varied from one area to another, but considerable quantities have been disposed of to more distant customers. The demand for cast-iron scrap, machinery grades in particular, is strong, so are specifications for short heavy steel scrap and the orders received by balers of blast-furnace scrap.

Lancashire—Much less textile machinery metal is now coming forward compared with a few months ago, but in spite of this the general supply position of cast-iron scrap is somewhat more comfortable than it has been of late and a steady demand from the foundries is being satisfied with less difficulty in consequence.

A reasonably good aggregate tonnage of steel melting scrap is being made available and steady deliveries are going forward to the mills.

Scotland—There has been a slight improvement in turnover as steelworks continue active, and are maintaining a strong demand for heavy steel and basic scrap. Merchants are experiencing no difficulty in disposing of these grades as they arise, and a steady flow is going forward to the various consumers. As the steelmakers' order-books are fairly well filled for some time ahead, there is little likelihood in any falling off in the demand for good steelmaking scrap.

The output of turnings is up to average, and regular consignments are being delivered. The production of cast-iron borings is maintained, and the blast furnaces are ready to accept all available arisings. The demand from the cast-iron foundries has been very steady, and a number of inquiries are presently circulating in the market for cast-iron scrap materials. There is keen competition to secure any suitable lots that come on the market, and merchants have no difficulty in disposing of any arisings.

South Wales—There is a very real hold-up in the South Wales iron and steel scrap industry. Many of the local steelworks are refusing deliveries of scrap, and in any case, it is only the heavy and better grade quality that is at all acceptable. Merchants are finding it increasingly difficult to dispose of their stocks and the market is very quiet.

It is not expected that there will be any immediate improvement, certainly not before the Easter holidays.

Fewer Foundries Set Castings Record

DESPITE the continuing reduction in the number of foundries in operation, a record output of castings during 1960 was reported in Birmingham last week at the annual meeting of the National and Midland Ironfounders' Association.

The retiring chairman, Mr. W. James, said that in spite of the levelling off operation in the motor industry, the output of grey iron castings had increased to give, for the fourth quarter of 1960, an annual output of more than 4,000,000 tons. For the whole of last year the ironfoundry industry had produced the greatest tonnage of castings in its history.

During 1960, 43 foundries ceased to operate and the total closures in the last 10 years amounted to 435, but, despite this, employment in the industry had increased last year by nearly 4,000, indicating that prejudice against employment in the trade had largely disappeared.

Mr. James said that great improvements had been made in dust control, suppression, and emission, and the industry was to be congratulated on its enterprising attitude to this problem. Officers elected were:—Chairman, Mr. E. Hunter; deputy chairman, Mr. E. C. Marsland; executive committee, Mr. W. James, Mr. H. Page, Mr. K. G. Siddons, Mr. A. C. Jones, and Mr. G. E. Lunt.

Further Decline in Exports of US Steel Products

THERE was a further fall in exports of steel mill products from the US in January to reach the lowest level since December, 1959. Imports were below any month since June, 1958, the Commerce Department reports. Exports during the month totalled 132,000 tons, compared with 162,000 tons in December, 1960, and 158,000 tons in January a year ago. Steel sheet, plate and tinplate accounted for most of the decline. The sharp drop in the last few months has been attributed to the cutback in car production in Western Europe, increased competition from European and Japanese producers and seasonal factors in the case of tinplate sales.

January imports of steel mill products in the US totalled 145,000 tons, 44,000 tons below December, 1960, and less than one third of the tonnage received in January a year ago when imports were still affected by the steel strike. A drop of 23,000 tons in purchase of concrete reinforcing bars accounted for most of the decline. The reduced level of steel consumption in the US in recent months, higher prices of imported steel and increased sales efforts by domestic steel producers are contributing to reduce interest in foreign steel.

ORDERS WORTH £187,000 have been placed by Colvilles, Limited, with the heating and ventilating division of Sulzer Bros. (London), Limited, for air-conditioning and heating schemes as part of the £50,000,000 development programme at Ravenscraig and Gartcosh (Lanarkshire). At Ravenscraig the new strip mill sales office will be air-conditioned with "Clima" high-velocity convectors, and for the 2,000-ft. long cold reduction mill at Gartcosh radiant strip heating will be used.

Increase in ECSC Coal Demand Forecast

ESTIMATES for the state of the ECSC coal market in the second quarter of the current year, issued by the High Authority, state that stocks, which have been falling since last summer, will rise again slightly. Although demand for hard coal is expected to increase, this will be met by increased production. Total coal available over the period will amount to 63,300,000 metric tons, compared with 61,700,000 tons for the second 1960 quarter. Of this total, 58,400,000 (57,300,000) tons will result from ECSC production and 4,900,000 (4,400,000) tons from imports from outside the Community.

The lost production resulting from dropped shifts, which in the second quarter of last year amounted to 2,200,000 tons, has been left unestimated in the current forecast, though it is stated that the partial unemployment resulting from such lost shifts will fall considerably. Demand in the 1961 second quarter is estimated at 61,280,000 (60,800,000) tons, and with ECSC exports placed at 1,000,000 (900,000) tons, stocks of coal are expected to increase by 1,100,000 tons.

By mid-February, ECSC stocks stood at 26,700,000 tons, compared with 27,600,000 tons at the end of last year. Coking plant stocks of coke are expected to decrease by 350,000 tons to under 6,000,000 tons in the period, although production, at 18,900,000 tons, will be higher by 500,000 tons than in the corresponding quarter of 1960.

Yorkshire Miners' Leader Warns on "Violation of Rules"

WARNING that power in the administration of the Yorkshire Area of the National Union of Mineworkers must remain with the Area Council was given by Mr. Sam Bullough, Area president, at the annual meeting of the Area Council at Barnsley last week. He said: "If that power is weakened or removed by certain activities, it is the beginning of the collapse of the trade union movement. We must see that this never happens. We must see to it that the breaking and violation of the rules is stopped." He added that 1960 had been a very difficult year for the industry, but it was pleasing to see that it had been a record-breaking one in the reduction of fatal and serious accidents.

The Council is to nominate Mr. Fred Collindridge (62), Area secretary, for the national vice-presidency to succeed Mr. Ted Jones, who is retiring. Mr. Collindridge has been Area secretary since 1954, before which he was Area vice-president for eight years.

The Yorkshire Area Council on Thursday of last week ordered an investigation into the recent strike and a committee of the Area executive is to carry out the inquiry. The committee, which will be headed by Mr. Bullough, will also examine the activities of some of the 22 candidates for the Area vice-presidency during the strike. Meanwhile the poll has been postponed.

AYRSHIRE DOCKYARD COMPANY, LIMITED, has changed its name to Ayrshire Metal Products, Limited, as the company has abandoned its shiprepair work and has become more widely known as one of Scotland's leading producers of light engineering products. No changes in the ownership or directorate of the firm are involved.

End of Seller's Market for Coal

"I BELIEVE that when the economic history of this decade is written, the coal industry will have very little to be ashamed of," said Mr. R. W. Parker, chairman of the Scottish Divisional Coal Board, at Kirkcaldy (Fife), last week. He thought the industry had come out of the years of crisis pretty well.

MR. R. W. PARKER

Mr. Parker was speaking at a dinner at Dysart at which awards were made to the East Fife Area and the Randolph Colliery, Kirkcaldy, which had the lowest accident rates in the Division and Area respectively. Wellesley Colliery, Buckhaven, also received an award for the best improvement in the accident rate in the Area over the last three years.

Mr. Parker said that from nationalization in 1947 until 1957-58, the industry had been in a seller's market. Then came a dropping away in the demand for coal with the increase in availability of alternative fuels—water power, atomic power, and oil. "From now on there is going to be no monopoly in the terms that there were before. We are going to have to meet these other fuels on a basis of, broadly, free competition."

Mr. Parker presented the J. N. Williamson Cup to the East Fife Area, whose figure of 76 accidents per 100,000 manshifts was the best in the division. Mr. A. M. Stewart, Area production manager, who accepted the trophy—it has been won six times by West Fife and three times by East Fife—said they had been steadily increasing their mechanized output, and he felt this would have had a beneficial effect on the accident rate.

Mr. John McArthur, Fife district secretary of the National Union of Mineworkers, presented Randolph Colliery with an award for having the best figure in the Area of 17 accidents per 100,000 manshifts. Mr. H. Hyde, HM Divisional Inspector of Mines & Quarries, said he felt not enough attention was being paid to training people before plant of a new type was introduced to a pit.

MANPOWER BUILD-UP AT NEW ANTHRACITE COLLIERY

ON Tuesday 84 miners from Varteg Colliery, Swansea Valley, were transferred to the new Abernant Colliery, near Pontardawe. A spokesman for the South-Western Divisional Coal Board described the moves as an interim stage in building up the manpower at the new colliery before it is commissioned later this year.

The men from Varteg will man the first shaft which comes into operation in the near future. When in full production, Abernant is expected to give an annual output of 750,000 tons of high-grade anthracite.

International Nickel's New Plant Opened

COMMERCIAL production of refined nickel started at the weekend at the new mine of the International Nickel Company of Canada, Limited, at Thompson, 400 miles north of Winnipeg, Manitoba. Known as the Thompson Project, the plant is now the most modern and second largest nickel producing centre in Canada. The $185,000,000 project, of which the cost to International Nickel is about $130,000,000, is exceeded in size only by the company's operations in Ontario. It will increase Inco's annual nickel producing capacity by more than 75,000,000 lb. to over 385,000,000 lb.

The plant, the first fully integrated plant for refined nickel, was officially opened by Mr. Dufferin Roblin, Premier of Manitoba, accompanied by Mr. Henry S. Wingate, chairman of Inco, and Mr. J. Roy Gordon, president of the company. Dr. John F. Thompson, retired chairman and now honorary chairman of the company was also present.

Highly mechanized to effect economical production, the plant consists of mine, headframe and concentrator, smelter, refinery, and service buildings. The refinery employs a new process which was developed by company research scientists and engineers. Power for the operations and for the adjacent new town of Thompson, is furnished by the Kelsey Generating Station of the Manitoba Hydro-Electric Board, on the Nelson River 53 miles to the north-east. The plant at present employs 1,800, but this will increase soon to 2,300. The town of Thompson has been planned to accommodate a population of 8,000 with provision for expansion.

Mr. Wingate said at the opening that all of the new output from Manitoba must go outside of Canada to find use in the d.versified markets being built up in the United States, Europe and elsewhere oversea. Although Canada was the world's leading supplier of nickel, its own consumption was capable of supporting not much more than one of every 40 lb. of the country's nickel producing capacity.

Swan, Hunter Shipyards to be Combined

WALLSEND and Neptune shipyards of Swan, Hunter, & Wigham Richardson, Limited, are to be combined under one management. Mr. P. Denham Christie, a director of the company and at present managing director of the Neptune works, has been appointed executive officer in charge of the two shipyards. He will be assisted by Mr. T. McIver, a director of the company. Mr. McIver, at present general manager of Wallsend shipyard, has been appointed general manager of both yards.

Appointed director responsible for ensuring rationalization of methods within the group is Mr. S. C. Swan, a director of all the companies within the Swan, Hunter group.

Mr. Tom Christie, present general manager of Neptune shipyard, has joined the board of Barclay, Curle & Company, Limited, a subsidiary of Swan, Hunter, and has been appointed general manager of the Clydeholm shipyard, the appointments to take effect later this year. Mr. W. H. McLay, present general manager of Clydeholm shipyard and a director of Barclay, Curle will become managing director.

Scrap Metal Trade Future Causes Concern

CONCERN for the future of their business is being shown by the iron and steel scrap merchants. At a luncheon in Cardiff last week, Col. W. Harold John, president of the South Wales and Western Counties Association of Iron and Steel, Scrap and Tinplate Merchants, posed the question: "Was the scrap merchant to play a big part in meeting the increasing quantities of raw materials needed in the big steel expansion plans, or would science and new processes make their role a diminishing one?" Col. John said that at the moment the trade was passing through a recession: "We hope it is only a hesitation."

He went on: "If those in the know have sufficient confidence to spend large sums on such huge schemes as the big new steel works at Newport, then I see no reason for apprehension on our part."

Mr. C. Rollinson, president of the National Federation of Scrap Iron, Steel and Metal Merchants, said he had no lack of confidence in the future. Suggesting that they should not talk themselves into a recession, Mr. L. R. P. Pugh, managing director of Guest Keen Iron & Steel Works, Cardiff, contrasted the position in 1958, when capital investment was at a low ebb, with today, when it is very high.

Progress on Spencer Steelworks Furnaces and Coke Ovens

FIRST of the two blast furnaces at the Spencer steelworks of Richard Thomas & Baldwins, Limited, at Newport (Mon), has reached its allotted height, and the bulk of the 145 coke ovens is now approaching completion, Mr. Wilfrid Goatman, public relations officer for the works, told members of a local authority last week. The eastern skyline of Newport was already radically altered, consultants, engineers and architects having "shaped the development as a co-ordinated whole, so that the face the Spencer works shows the world is well-groomed, acceptable, and pleasing."

Referring to local fears of air pollution, Mr. Goatman said the company was taking every possible precaution, and was building in the works protection devices of the most modern kind in units which might otherwise be a source of offence. Housing employees would also be a primary problem, with 6,000 working at the plant at its first stage of development.

MEXICAN TRADE DELEGATION TO SEEK UK MACHINERY

GROUP of 30 to 40 Mexican businessmen interested in acquiring manufacturing equipment will be arriving in England about April 5. Headed by Dr. Emilio Vera Blanco, president of the Chamber of the National Manufacturing Industry, they will be looked after in England by the Federation of British Industries and the Western Hemisphere Exports Council.

They are interested in acquiring manufacturing machinery for making offset equipment, iron and steel stamping machines, the latest uses in oxygen in metal hardening, machinery for making sugar bagasse into paper, carbon paper making and automatic slot machines, and hope to arrange for financial and technical assistance where necessary.

Exports of British Coal

DETAILS of British coal exports and bunker coal shipments in February, and the totals for the first two months of this year and last, are given below.

	Month ended Feb. 28.	Two months ended February 28.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Categories.			
Anthracite—			
Large	4,596	14,033	11,690
Graded	13,861	39,401	39,156
Cleaned smalls	14,571	35,975	42,494
All other	35,755	66,315	68,770
Steam coal (including household)—			
Large	52,011	155,780	116,611
Graded	20,954	110,693	52,532
Cleaned smalls	88,733	190,998	208,035
Untreated smalls	99,125	174,883	207,908
Other	13,824	47,700	26,751
Gas coal—			
Unscreened	4,661	51,547	25,550
Graded	22,865	78,620	66,462
All other	4,030	14,301	6,946
Coking coals	12,317	24,049	25,730
TOTAL	387,303	1,003,995	898,635
Destinations.			
Canada	—	—	—
Other Commonwealth countries	3,263	5,048	3,270
Eire	85,424	255,001	191,109
Finland	5,209	7,748	8,533
Sweden	13,697	41,158	31,496
Norway	11,703	23,493	20,941
Denmark	73,941	333,546	231,101
Western Germany	47,829	67,217	82,045
Netherlands	72,009	130,920	164,039
Belgium	16,280	37,604	32,777
France	20,625	37,967	50,187
Portugal	11,936	31,984	36,575
Italy	11,862	17,344	32,105
Other foreign countries	11,525	14,965	14,457
Fuel taken on board vessels engaged in the foreign trade (including fishing vessels) for their own use—			
British flag	7,939	70,977	17,105
Other flags	1,710	8,006	4,231

Exports of Coke and Patent Fuel

THE following table gives figures of exports of coke and manufactured fuels from the United Kingdom during February, and the totals for the first two months of this year and last.

Products.	Month ended Feb. 28.	Two months ended February 28.	
	1961.	1960.	1961.
Gas coke	59,442	140,808	157,336
Hard coke	24,392	77,916	63,929
Breeze	22,193	63,713	46,816
Manufactured fuel	4,295	33,736	11,264
TOTAL	110,322	316,173	279,345

MR. SAM RIX has retired after 52 years in the coal mining industry. For the past 20 years he has been a deputy at Ramcroft Colliery (Derbyshire).

Imports and Exports of Mining Machinery

ACCORDING to Board of Trade returns, mining machinery (other than portable power tools) valued at £104,552 was imported during February, compared with £115,015 in February, 1960. Imports for the first two months of the year were valued at £225,104 against £185,448 in the corresponding period of 1960.

The appended table contains figures of export values of mining and well-drilling machinery in February and values for the first two months of this year and last.

Destination.	Month ended Feb. 28.	Two months ended February 28.	
	1961.	1960.	1961.
	£	£	£
Union of South Africa	28,436	160,769	66,781
India	72,745	220,814	151,385
Australia	23,195	62,801	58,077
Canada	67,718	76,729	106,026
Trinidad	9,135	36,891	32,063
Other Commonwealth countries and Eire	103,266	302,293	249,794
Argentina	3,584	297,751	9,242
Other foreign countries	186,976	594,296	606,500
TOTALS			
Well-drilling machinery—			
Petroleum	173,958	673,647	449,795
Other	43,428	87,269	102,886
Mining machinery (excluding portable power tools)—			
Coal-cutters, power operated—			
Complete	7,292	124,522	81,666
Parts	46,972	177,101	120,640
Conveyors, underground—			
Complete and parts	127,658	273,790	221,060
Winders, power operated	17,061	96,360	54,376
All other	78,686	319,655	249,445
TOTAL	495,055	1,752,344	1,279,868

Sardinia to Provide Power for Italy

UTILIZING the entire output of the poor quality coal from the Sulcis mines a 400 mW thermo-electric plant will feed power from Sardinia into the Italian grid. The plant is to be built at Carbonia, southern Sardinia, and the power will be conveyed via Corsica to the west coast of Italy by underwater cable.

One of the main purposes of the scheme is to provide an economically sound outlet for the Sulcis coal, the output of which is between 700,000 and 800,000 tons a year. Initially the generating plant will have an output of 400 mW, but at a later stage it will probably be increased to 600 mW. At the lower figure it would be too great for Sardinian consumption and therefore it is being fed into the Italian grid.

The English Electric Company, Limited, has been mentioned as the likely contractors for the plant and the contract will be worth about £25,000,000.

A SEARCH by the Mexborough and Swinton Traction Company, Limited, has revealed that among the company's oldest passengers are four 80-year-old ex-miners, who have each spent more than £250 in fares on the company's transport. The ex-miners have been invited to a banquet at a Sheffield hotel.

Imports and Exports of Iron and Steel

FIGURES of imports and exports of iron and steel in February are given in the following tables, based on the Board of Trade returns, and including totals for the first two months of 1960 and 1961.

Total Exports of Iron and Steel

Destination.	Month ended Feb. 28.	Two months ended February 28.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Malta	245	1,825	564
Sierra Leone	1,372	783	3,616
Ghana	870	3,125	2,703
Nigeria	4,381	10,883	15,696
Union of South Africa	7,277	12,103	12,751
South-West Africa	1,518	124	4,229
Rhodesia and Nyasaland	2,930	3,246	6,424
Tanganyika	1,290	1,502	3,933
Kenya	2,642	3,587	7,046
Uganda	69	315	489
Mauritius	152	464	391
Bahrein, Qatar, and Trucial States	950	1,546	2,452
Kuwait	1,600	672	2,297
India	30,146	40,008	50,185
Pakistan	2,690	14,212	6,922
Singapore	2,440	2,491	4,491
Malaya	2,152	3,206	4,615
Ceylon	2,129	9,621	4,760
British North Borneo	220	935	536
Hongkong	4,874	11,886	10,427
Australia	13,889	30,535	38,062
New Zealand	29,583	15,433	55,596
Canada	9,476	39,117	22,164
Jamaica	1,541	4,076	3,576
Trinidad	3,468	6,843	7,061
British Guiana	779	1,222	1,467
Other Commonwealth countries	2,294	4,753	4,112
Eire	6,472	10,259	13,781
Soviet Union	3,893	3,460	5,465
Finland	4,078	6,449	7,697
Sweden	15,028	40,332	31,836
Norway	10,031	23,425	19,956
Denmark	8,843	17,982	16,399
Poland	2,244	2,815	2,520
Western Germany	9,477	35,017	16,317
Eastern Germany	1,440	6,764	3,310
Netherlands	10,113	24,403	18,992
Belgium	2,863	7,911	3,473
France	276	1,207	1,545
Switzerland	1,327	2,345	3,355
Portugal	2,773	2,622	4,124
Spain	1,210	2,829	3,131
Italy	5,353	7,783	10,125
Austria	326	612	927
Yugoslavia	983	1,906	5,003
Greece	4,347	3,127	8,226
Turkey	1,878	357	3,923
Netherlands Antilles	123	1,294	174
Portuguese East Africa	131	883	360
Egypt	863	3,679	5,091
Libya	822	1,916	1,505
Sudan	747	2,176	2,017
Israel	1,241	5,214	4,252
Saudi Arabia	52	98	299
Iraq	1,503	5,538	14,309
Iran	1,311	15,308	3,521
Burma	564	1,931	809
Thailand	448	1,934	1,219
Indonesia	463	4,663	1,764
China	2,773	13,804	5,672
Japan	8,585	11,137	21,877
Philippine Republic	116	2,132	896
USA	6,888	62,493	14,364
Cuba	257	1,558	491
Mexico	284	842	430
Colombia	982	2,400	2,994
Venezuela	1,020	8,244	2,842
Ecuador	386	494	593
Peru	609	1,087	1,413
Chile	332	446	648
Brazil	1,330	3,424	1,756
Uruguay	1,197	1,911	1,471
Argentina	11,186	18,782	16,983
Other foreign countries	10,843	10,864	14,764
TOTAL	278,988	610,370	579,143

Total Imports of Iron and Steel

From	Month ended Feb. 28.	Two months ended February 28.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Union of South Africa	4,040	9,584	6,410
Rhodesia and Nyasaland	1,724	1,500	8,077
Canada	12,677	5,804	36,553
Other Commonwealth countries and Eire	5,146	6,515	10,270
Soviet Union	1,239	7,607	4,794
Sweden	4,990	7,228	9,286
Norway	10,603	22,120	22,358
Poland	80	3,086	221
Western Germany	2,106	26,443	8,145
Netherlands	7,921	30,114	15,086
Belgium	5,579	11,189	10,224
Luxembourg	3,033	1,661	5,992
France	2,784	9,327	5,631
Italy	54	2,345	208
Austria	505	2,038	807
Japan	696	1,175	1,728
USA	696	1,175	1,728
Other foreign countries	1,118	5,094	1,832
TOTAL	65,395	163,636	150,443
Iron and steel scrap and waste fit only for the recovery of metal	1,664	23,606	3,289

Exports of Iron and Steel by Product

Product.	Month ended Feb. 28.	Two months ended February 28.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Pig-iron	9,624	44,416	17,327
Ferro-columbium (niobium)	2	21	7
Ferro-tungsten	90	208	175
Other ferro-alloys	422	1,537	716
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	3,315	13,302	4,423
Pieces roughly shaped by forging	140	113	340
Iron bars, rods, angles, shapes, and sections	89	346	353
Steel bars, rods, angles, sections, and shapes	56,430	111,475	121,846
Iron plates and sheets	78	147	227
Universal plates	1,319	3,526	2,034
Steel plate, 3 mm. and under 4.5 mm. thickness	2,716	5,813	5,671
Ditto, 4.5 mm. or more in thickness	23,030	50,460	58,913
Blacksheets and blackplate	31,456	53,547	56,115
Hoop and strip	10,442	16,335	21,922
Tinplate	44,137	107,197	77,426
Decorated tinplate	589	513	1,162
Galvanized sheets	7,422	11,131	13,000
Other (incl. tinned sheets, terneplate, and ternesheets)	2,441	5,856	6,795
Railway and tramway construction material	18,727	19,482	42,472
Wire rods of steel (incl. alloy steel)	5,931	11,632	9,823
Wire	12,375	19,675	23,227
Tubes, pipes, and fittings	48,213	133,638	115,169
TOTAL	278,988	610,370	579,143

INCENTIVE BONUS SCHEME under which employees can gain up to £125 a year has been announced by the Skefko Ball Bearing Company, Limited. The scheme is backdated to January 1 and the first payment will be made on June 30.

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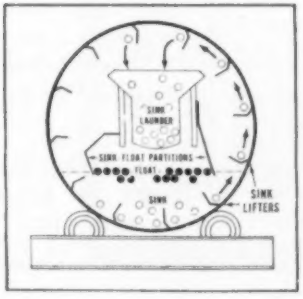

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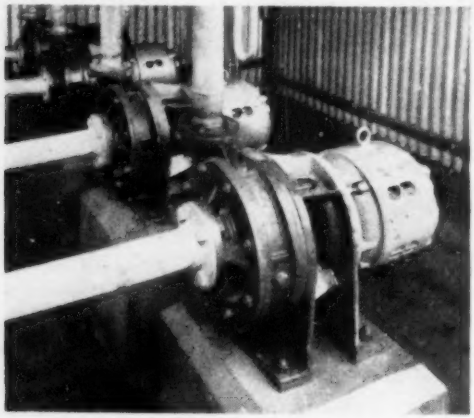

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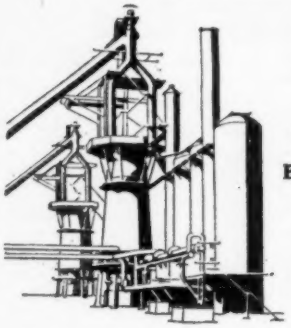

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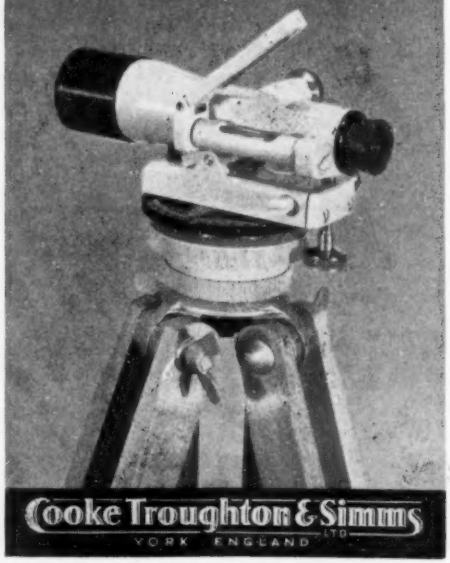

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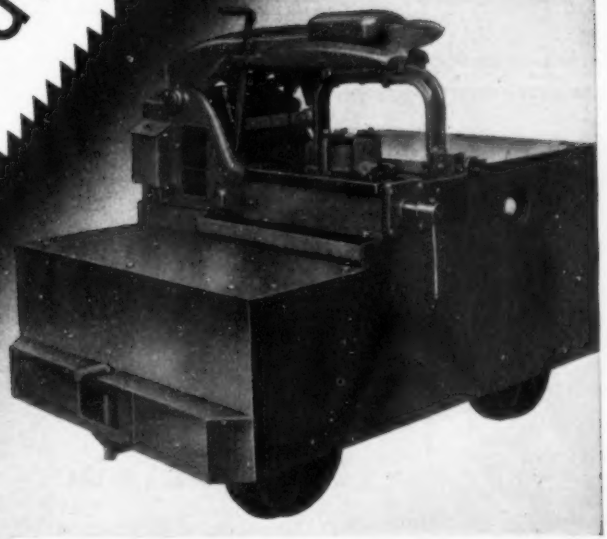

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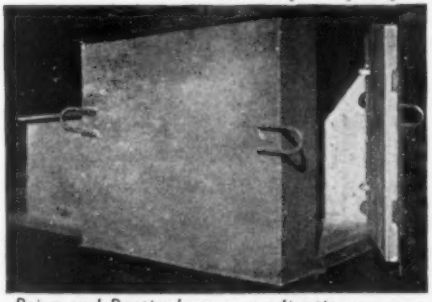

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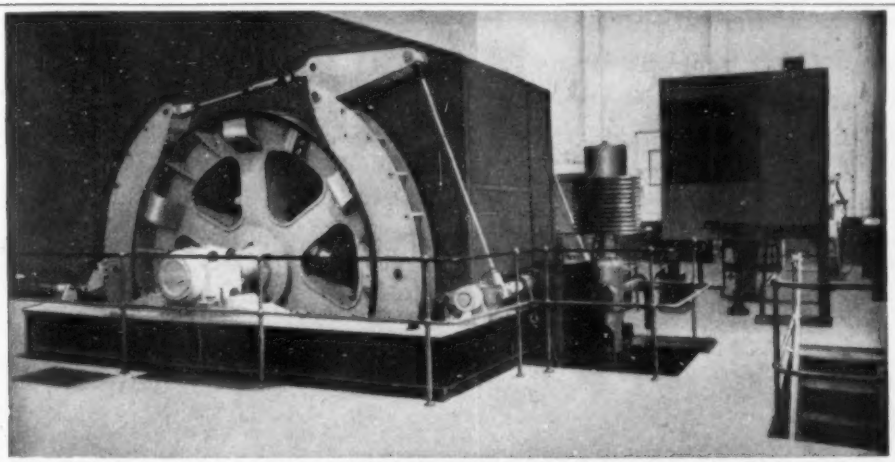

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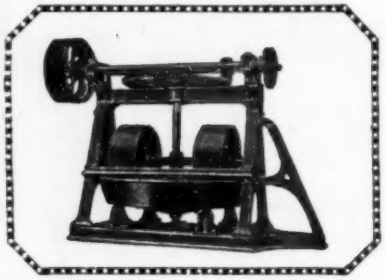

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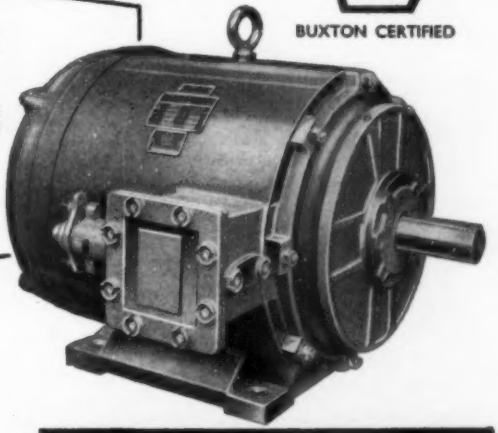

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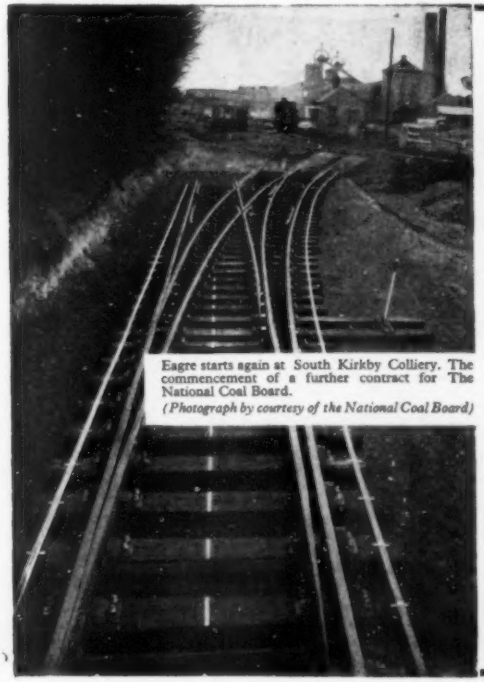

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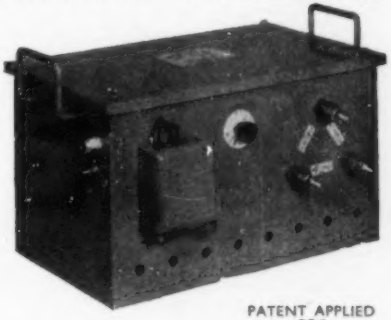

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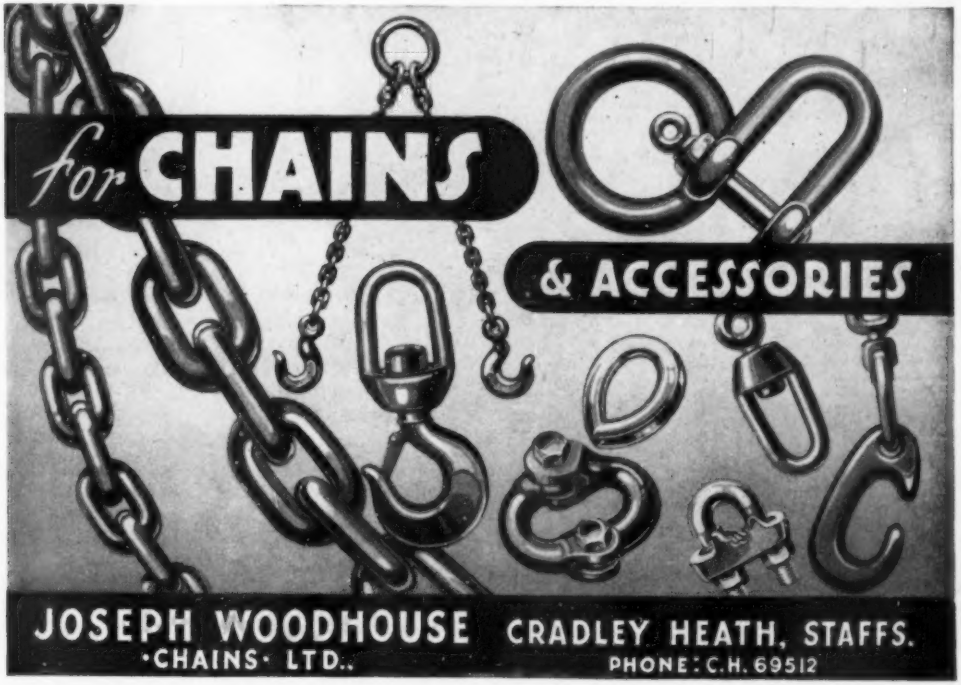

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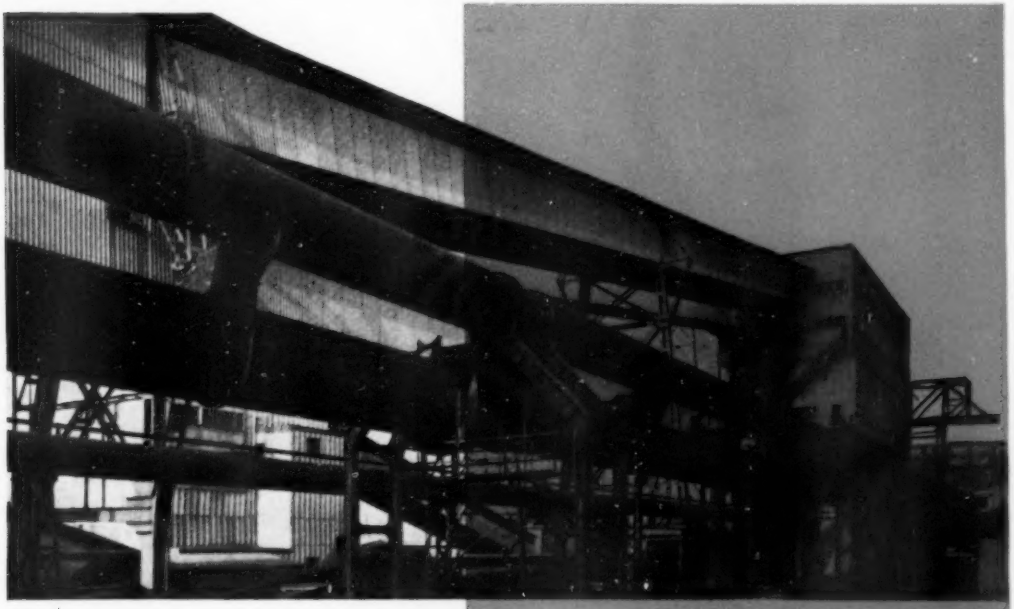

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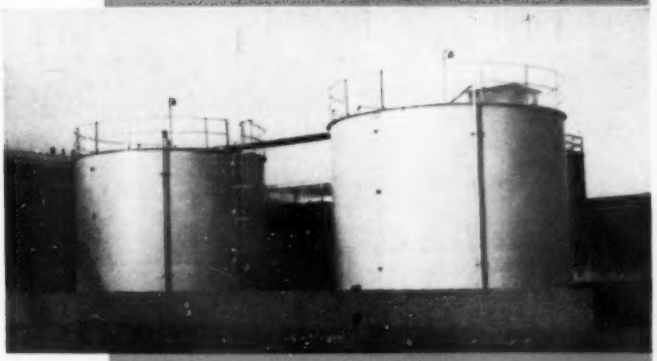

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